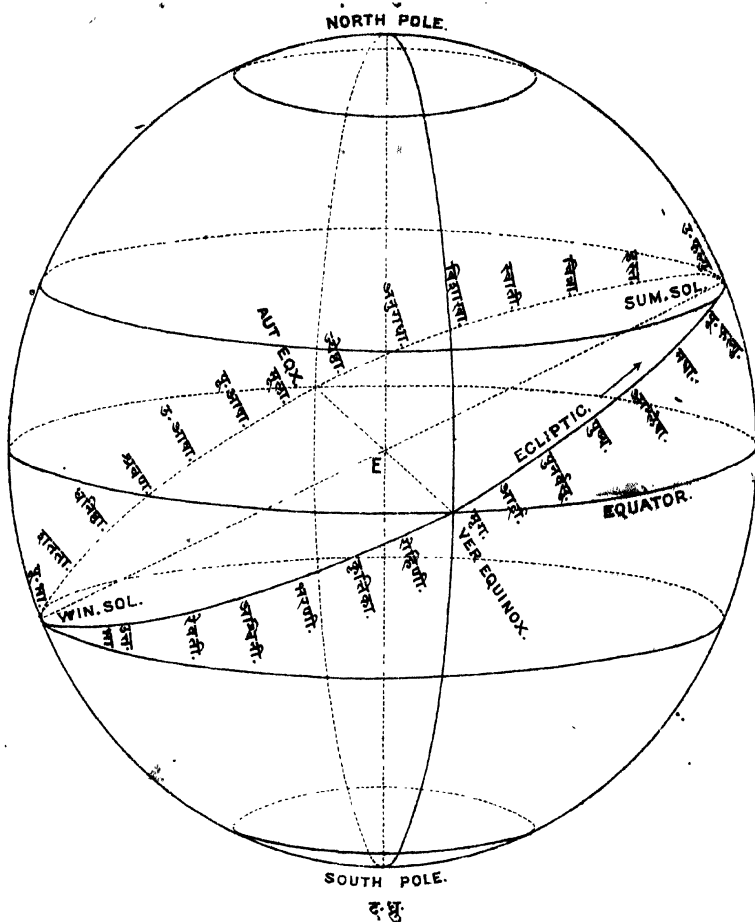


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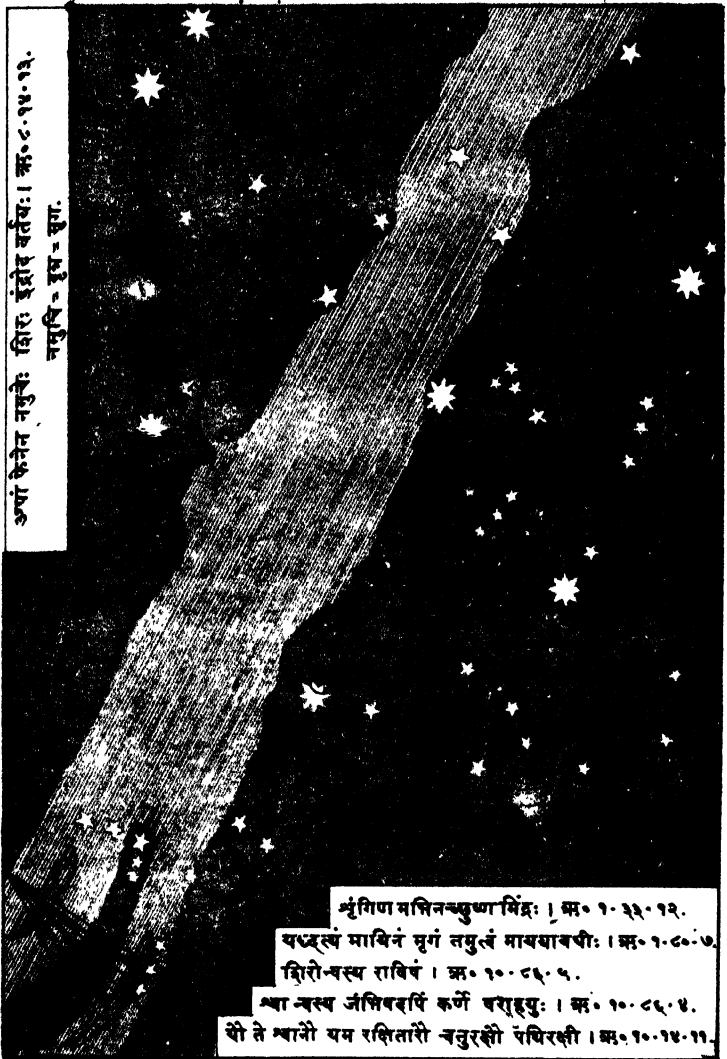
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EXPLANATION:— The figure is drawn on the supposition that the earth (E) is in the centre, that the sun moves in the Ecliptic, and the precession of the equinoxes is caused by the motion of the Ecliptic. With a given Nakshatra at the vernal equinox, we can here at once find what Nakshatras would be at the other cardinal points and hence also the month at the winter solstice.

अपां केनेन ननुवेः क्षिरः इंद्रोद्वर्तयः । क्र० ८. १४. १३.
नमुषि = दुष = युग.



मृतिगणमग्निव्युष्णमिंद्रः । क्र० १. ३३. १३.

यध्वस्य मादिनें मृगं तमुत्वं माययावपीः । क्र० १. ८०. ७.
क्षिरो-वस्य राविषं । क्र० १०. ८६. ५.

श्वा-वस्य जम्बिबर्हिं कर्णे वरूहयुः । क्र० १०. ८६. ४.

यो ते श्वानो यम रक्षितारो बभुरक्षो पथिरक्षी । क्र० १०. १४. ११.

श्वानं वस्तो बोधयितारमब्रवीत्संवत्सर इदमद्या व्यरव्यत । क्र० १. १६१. १३.

Spana. pashupana. Vd. xiii. 9

Spanem. zairitem. chathru.

chashmem. Vd. viii 16.

[See pages 110, 111.

ORION

OR

Researches into the Antiquity of the Vedas.

BY

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PREFACE.

SOME explanation may be necessary for the publication of an essay on the antiquity of the Vedas by one whose professional work lies in a different direction. About four years ago, as I was reading the Bhagavad Gîtâ, it occurred to me that we might derive important conclusions from the statement of Kṛishṇa that “he was Mārgashīrṣha of the months.” This led me to inquire into the primitive Vedic calendar, and the result of four years’ labour is now placed before the public. The essay was originally written for the Ninth Oriental Congress held in London last year. But it was found too large to be inserted in the proceedings wherein its summary alone is now included. I have had therefore to publish it separately, and in doing so I have taken the opportunity of incorporating into it such additions, alterations and modifications, as were suggested by further thought and discussion.

The chief result of my inquiry would be evident from the title of the essay. The high antiquity of the Egyptian civilization is now generally admitted. But scholars still hesitate to place the commencement of the Vedic civilization earlier than 2400 B.C. I have endeavoured to show in the following pages that the traditions recorded in the Rigveda unmistakably point to a period *not later* than 4000 B. C., when the vernal equinox was in Orion. or, in other words. when the Dog-star (or the Dog as we have it in the Rigveda) commenced the equinoctial year. Many of the Vedic texts and legends, quoted in support of this conclusion, have been cited in this connection and also ration-

ally and intelligently explained for the first time, thus throwing a considerable light on the legends and rites in later Sanskrit works. I have further tried to show how these legends are strikingly corroborated by the legends and traditions of Iran and Greece. Perhaps some of this corroborative evidence may not be regarded as sufficiently conclusive by itself, but in that case I hope it will be borne in mind that my conclusions are not based merely upon mythological or philological coincidences, and if some of these are disputable, they do not in any way shake the validity of the conclusions based on the *express* texts and references scattered over the whole Vedic literature. I wanted to collect together all the facts that could possibly throw any light upon, or be shown to be connected with the question in issue, and if in so doing I have mentioned some that are not as convincing as the others, I am sure that they will at least be found interesting, and that even after omitting them there will be ample evidence to establish the main point. I have, therefore, to request my critics not to be prejudiced by such facts, and to examine and weigh the whole evidence I have adduced in support of my theory before they give their judgment upon it.

I have tried to make the book as little technical as possible ; but I am afraid that those who are not acquainted with the Hindu method of computing time may still find it somewhat difficult to follow the argument in a few places. If my conclusions come to be accepted and the second edition of the book be called for, these defects may be removed by adding further explanations in such cases. At present I have only attempted to give the main argument on the assumption that the reader is already familiar with the method. I may further remark that though I have

used the astronomical method, yet a comparison with Bentley's work will show that the present essay is more literary than astronomical in its character. In other words, it is the Sanskrit scholars who have first of all to decide if my interpretations of certain texts are correct, and when this judgment is once given it is not at all difficult to astronomically calculate the exact period of the traditions in the Rigveda. I do not mean to say that no knowledge of astronomy is necessary to discuss the subject, but on the whole it would be readily seen that the question is one more for Sanskrit scholars than for astronomers to decide.

Some scholars may doubt the possibility of deriving so important and far-reaching conclusions from the data furnished by the hymns of the Rigveda, and some may think that I am taking the antiquity of the Vedas too far back. But fears like these are out of place in a historical or scientific inquiry, the sole object of which should be to search for and find out the truth. The method of investigation followed by me is the same as that adopted by Bentley, Colebrooke and other well-known writers on the subject, and, in my opinion, the only question that Sanskrit scholars have now to decide, is whether I am or am not justified in carrying it a step further than my predecessors, independently of any modifications that may be thereby made necessary in the existing hypothesis on the subject.

I have omitted to mention in the essay that a few native scholars have tried to ascertain the date of the Mahābhārata, and the Rāmāyaṇa from certain positions of the sun, the moon and the planets given in those works. For instance, the horoscope of Rāma and the positions of the planets at the time of the great civil war, as found in the Mahābhārata,

are said to point to a period of 5000 or 6000 B. C., and it is contended that the Vedas which preceded these works must be older still. Bentley relying on the same data has calculated 961 B. C. as the exact date of Râma's birth. This will show how unsafe it is to act upon calculations based upon such loose statements. Sometimes the accounts in the Purâṇas are themselves conflicting, but even where they are or can be made definite any conclusions based on them are not only doubtful, but well nigh useless for chronological purposes, for in the first instance they are open to the objection that these works may not have been written by eye-witnesses (the mention of *Râshis* in the Râmâyana directly supporting such an assumption), and, secondly, because it is still more difficult to prove that we now possess these books in the form in which they were originally written. With regard to the positions of the planets at the time of the war given in the Mahabharata, the statements are undoubtedly confused; but apart from it, I think that it is almost a gratuitous assumption to hold that all of them really give us the positions of the planets in the ecliptic and that such positions again refer to the fixed and the moveable zodiacal portions of the Nakshatras. Perhaps the writers simply intend to mention all auspicious or inauspicious positions of the planets in such cases. I have therefore avoided all such debatable and doubtful points by confining myself solely to the Vedic works, about the genuineness of which there can be no doubt, and using the Purâṇic accounts only to corroborate the results deduced from the Vedic texts. According to this view the Mahabharata war must be placed in the Kṛittikâ period, inasmuch as we are told that Bhîshma was waiting for the turning of the sun from the winter solstice in the month

of Magha. The poem, as we now have it, is evidently written a long time after this event.

Lastly, I have to express my obligations to several friends for encouraging me to carry on the inquiry and helping me in one way or another to complete this essay. My special thanks are however due to Dr. Rāmkrishna Gopāl Bhāndārkar, who kindly undertook to explain to me the views of German scholars in regard to certain passages from the Rigveda, and to Khan Bahadur Dr. Dastur Hoshang Jamasp for the ready assistance he gave in supplying information contained in the original Parsi sacred books. I am also greatly indebted to Prof. Max Muller for some valuable suggestions and critical comments on the etymological evidence contained in the essay. I am, however, alone responsible for all the views, suggestions, and statements made in the following pages.

With these remarks I leave the book in the hands of critics, fully relying upon the saying of the poet—

हेतुः संलक्ष्यते ह्यग्नौ विशुद्धिः श्यामिकाऽपि वा ।

“The fineness or the darkness of gold is best tested in fire.” It is not likely that my other engagements will permit me to devote much time to this subject in future; and I shall consider myself well rewarded if the present essay does in any way contribute to a fuller and unprejudiced discussion of the high antiquity of the Aryan civilization, of which our sacred books are the oldest records in the world.

B. G. TILAK.

Pooné, October, 1893.

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THE ORION;

OR

Researches into the Antiquity of the Vedas.

CHAPTER I.

Introduction.

Importance of ascertaining the age of the Vedas—Linguistic method—Its defects—Astronomical method—Its difficulties unduly magnified—Views of European and Native scholars examined.

THE VEDA is the oldest of the books that we now possess, and it is generally admitted "that for a study of man, or if you like, for a study of Aryan humanity, there is nothing in the world equal in importance with it."* There is no other book which carries us so near the beginning of the Aryan civilization, if not the absolute beginning of all things, as maintained by the Hindu theologians; and the importance of ascertaining even approximately the age when the oldest of the Vedic Rishis, like the classical Vālmiki, may have been inspired to unconsciously give utterance to a Vedic verse, cannot therefore be overrated. The birth of Gautama Buddha, the invasion of Alexander the Great, the inscriptions of Ashoka, the account of the Chinese travellers, and the overthrow of Buddhism and Jainism by Bhaṭṭa Kumārila and Shankarāchārya, joined with several other less important

**India: what it can teach us?* p. 112. The references throughout are to the first edition of this work.

events, have served to fix the chronology of the later periods of the Ancient Indian History. But the earlier periods of the same still defy all attempts to ascertain their chronology; and the earliest of them all, so important to the "true student of mankind," the period of the Rigveda, is still the subject of vague and uncertain speculations. Can we or can we not ascertain the age of the Vedas? This is a question which has baffled the ingenuity of many an ancient and modern scholar, and though I have ventured to write on the subject, I cannot claim to have finally solved this important problem in all its bearings. I only wish to place before the public the result of my researches in this direction and leave it to scholars to decide if it throws any additional light on the earliest periods of the Aryan civilization.

But before I proceed to state my views, it may be useful to briefly examine the methods by which Oriental scholars have hitherto attempted to solve the question as to the age and character of the Vedas. Prof. Max Müller divides the Vedic literature into four periods—the Chhandas, Mantra, Brâhmaṇa, and Sûtra; and as each period presupposes the preceding, while the last or the Sûtra period is prior, "if not to the origin, at least to the spreading and political ascendancy of Buddhism" in the fourth century before Christ, that learned scholar, by assigning two hundred years for each period arrives at about 1200 B. C., as the latest date, at which we may suppose the Vedic hymns to have been composed.* This, for convenience, may be

* See Max Müller's 1st Ed. of Rig. Vol. IV., Pref. pp. v., vii. This preface is also printed as a separate pamphlet under the title *Ancient Hindu Astronomy and Chronology*. In the second edition of the Rigveda the prefaces in the first edition are reprinted all together at the beginning of the fourth Volume.

called the literary or the linguistic method of ascertaining the age of the Vedas. A little consideration will, however, at once disclose the weak points in such arbitrary calculations. There are different opinions as to the division of the Vedic literature; some scholars holding that the Chhandas and Mantra is one period, though a long one. But granting that the Vedic literature admits of a four-fold division, the question of the duration of each period is still involved in uncertainty, and, considering the fact that each period might run into and overlap the other to a certain extent, it becomes extremely difficult to assign even the minimum chronological limits to the different periods. The method may, indeed, be used with advantage to show that the Vedas could not have been composed later than a certain period; but it helps little in even approximately fixing the correct age of the Vedas. Prof. Max Müller himself admits* that the limit of 200 years can be assigned to each period only under the supposition that during the early periods of history the growth of the human mind was more luxuriant than in later times; while the late Dr. Haug, following the same method, fixed the very commencement of the Vedic literature between 2400-2000 B. C.† by assigning about 500 years to each period, on the analogy of similar periods in the Chinese literature. It is therefore evident that this method of calculation, howsoever valuable

* Pref. to Rig. Vol. IV., p. vii.

† Introduction to the Aitareya Brahmana, p. 48. Prof. Whitney thinks that the hymns may have been sung as early as 2000 B. C. Vide Intro. to his Sanskrit Grammar, p. xiii. For a summary of the opinions of different scholars on this point see Kaegi's Rig-veda translated by Arrowsmith, p. 110, note 39. The highest antiquity assigned is 2400 B. C.

have to examine hereafter how far some of these objections are tenable. For the present it is sufficient to state that in consequence of such doubts and objections, definite observations of allusions to astronomical events in the earliest works have been looked upon with suspicion by a good many Oriental scholars, while some have even condemned the astronomical method as inaccurate and conjectural.* It is, however, admitted that "if the astronomical data on which conclusions as to the age of the Veda have been built implied all that they were represented to imply, the earliest periods of Vedic poetry will have to be rearranged."†

It appears to me that scholars have erred too much on the side of overcautiousness in condemning this method. I do not mean to say that there are no difficulties; but sufficient care does not appear to have been taken to always keep in view the main point of the inquiry, by separating it from the mass of irrelevant matter, with which, in some cases, it becomes unavoidably mixed up. Some of Bentley's speculations, for instance, are indeed ingenious and suggestive, but he relies too much upon Purānic traditions, mere etymological speculations and his own calculations based thereon, instead of trying to find out whether there is anything in the earlier works to corroborate or support these traditions. On the other hand, Prof. Weber's Essay, which, as a collection of astronomical allusions and references in the Vedic literature, is extremely valuable, is taken up by the controversy as to the origin of the Nakshatras raised by M. Biot; and the same thing may be said of Prof. Whitney's contributions on the subject.‡ Various

* See Weber's *History of Indian Literature*, p. 2, note.

† Prof. to Rig. Vol. IV., p. lxxi.

‡ See his essay on the Hindu and Chinese systems of Asterisms.

other questions, such as whether the Vedic cycle comprised five or six years, how and when the intercalary days or months were inserted to make the lunar correspond with the solar year, have also caused the attention of scholars to be diverted from the broad astronomical facts and observations to be found recorded in the Vedic literature; and as a consequence we find that while the questions as to the original number of the Nakshatras and as to whether the Chinese borrowed them from the Hindus or *vice versa*, are so ably discussed, no systematic attempt has yet been made to trace back the astronomical references in the later works to the Sanhitās, and to fully examine their bearing on the question of the age and character of the Vedas. On the contrary, Prof. Weber asks us to reconcile ourselves to the fact that any such search will, as a general rule, be absolutely fruitless!* In the following pages I have endeavoured to show that we need not be so much disappointed. In my opinion there is ample evidence—direct and circumstantial—in the earliest of the Sanhitās, to fully establish the high antiquity assigned to the Indian literature on geographical and historical grounds.† I base my opinion mainly upon references to be found in the early Vedic works, the Sanhitās and the Brāhmaṇas, and especially in the earliest of these, the Rigveda. For though later works may sometimes give the same traditions and references, yet any inference which is based upon them is likely to be regarded with more or less suspicion, unless we can show

* Weber's *History of Indian Literature*, p. 7.

† It is on these grounds that Prof. Weber believes that the beginnings of the Indian literature "may perhaps be traced back even to the time when the Indo-Aryans still dwelt together with the Persa-Aryans." *Hist. Ind. Lit.*, p. 5.

something in the earliest works themselves to justify that inference. Where the Samhitās and the Brāhmanas directly speak of the actual state of things in their time, there is, of course, no ground to disbelieve the same, but I think that even the traditions recorded in these works are more reliable than those in later works, for the simple reason that those traditions are there found in their purest form. Later works may indeed be used to supply confirmatory evidence, where such is available; but our conclusions must in the main be based on the internal evidence supplied by the Vedic works alone. Several Indian astronomers have worked more or less on the lines here indicated, but their labours in this direction have not unfortunately received the attention they deserve. The late Krishna Shāstri Godbole published his views on the antiquity of the Vedas in the second and third Volumes of the *Theosophist*,* and though he has failed to correctly interpret some astronomical allusions in the Vedic works, yet there is much that is suggestive and valuable in his essay. The late Prof. K. L. Chhatre also appears to have held similar views on the subject, but he has not published them, so far as I know, in a systematic form. My friend Mr. Shankara Bālkrishna Dikshit, who has written a prize essay in Marāṭhī on the history of Hindu Astronomy, and who has succeeded in correctly interpreting more verses in the Vedāṅga Jyotiṣha† than any other scholar has hitherto

* Also published as a separate pamphlet.

† Mr. Dikshit would do well to published an English translation of at least the Chapter on Vedāṅga Jyotiṣha in his essay. He has undoubtedly made a great advance over Weber and Thebaut in the correct interpretation of the treatise.

done, has also discussed this question in his essay, which I was allowed to read in MS. through his kindness. I am indebted to these scholars for some of the facts and arguments set forth in the following pages, and the present essay may, I think, be regarded as greatly developing, if not completing, the theory started by them.

CHAPTER II.

Sacrifice alias the year.

Primitive calendar co-eval with the sacrificial system—*Prājapati*—*Yajna*—*Samvatsara*—Civil or *Savana* days—*Savana* and lunar months—Lunar and solar years—Intercalary days and month in Vedic times—Solar year was sidereal and not tropical—Old beginning of the year and the sacrifice—The *Vi-shuvan* day—Vernal equinox and winter solstice—*Uttarayana* and *Dakshinayana*—*Devayana* and *Pitriyana*—Their original meaning—*Bhaskaracharya*'s mistake about the day of the *Devas*—The two year beginnings were subsequently utilised for different purposes.

It is necessary, in the first place, to see what contrivances were adopted by the ancient Aryas for the measurement and division of time. The present Indian system has been thus described by Professor Whitney in his notes to the *Sūrya Siddhanta* (i. 13, notes) —

“In the ordinary reckoning of time, these elements are variously combined. Throughout Southern India (see *Warren's Kāla Sankalita*, Madras, 1825, p. 4. etc.), the year and month made use of are the solar, and the day the civil; the beginning of each month and year being counted, in practice, from the sunrise nearest to the moment of their actual commencement. In all Northern India the year is luni-solar; the month is lunar and is divided into both lunar and civil days; the year is composed of a variable number of months, either twelve or thirteen, beginning always with the lunar month, of which the commencement next precedes the true commencement of the sidereal year. But underneath this division, the division of the actual sidereal year into twelve solar months

"is likewise kept up, and to maintain the concurrence of
 "the ~~sign~~ and lunar days, and the lunar and solar months,
 "is a process of great complexity, into the details of which
 "we need not enter here."

But the complications here referred to are evidently the growth of later times. The four ways of reckoning time, the *Savana*, the *Chandra*, the *Nákshatra* and the *Saura*, are not all referred to in the early works, and even in later days all these measures of time do not appear to have been fully and systematically utilised. There is, as I have said before, no early work extant on Vedic calendar, except the small tract on *Jyotisha*, and our information about the oldest calendar must, therefore, be gathered either from stray references in the Vedic works or from the early traditions or practices recorded in the old sacrificial literature of India. There are several sacrificial hymns in the *Rigveda*, which show that the sacrificial ceremonies must then have been considerably developed; and as no sacrificial system could be developed without the knowledge of months, seasons, and the year, it will not be too much to presume that in Vedic times there must have existed a calendar to regulate the sacrifices. It is difficult to determine the exact nature of this calendar, but a study of the sacrificial literature would show that the phases of the moon, the changes in the seasons, and the southern and northern courses of the sun were the principal land-marks in the measurement of time in those early days. What is still more interesting, however, is that the leading features in the early sacrifices are the same as those in the year. The late Dr. Haug, in his introduction to the *Aitareya Brahmana*, has observed that "the *sautras*, which lasted for one year, were nothing but an imitation of the sun's yearly course. They were divided

into two distinct parts, each consisting of six months of 30 days each. In the midst of both was the *Vishuvam*, i. e., the equator or the central day, cutting the whole *samvatsara* into two halves.* This clearly shows that the ancient Rishis prepared their calendar mainly for sacrificial purposes, and the performance of various sacrifices facilitated, in its turn, the keeping up of the calendar. Offerings were made every morning and evening, on every new and full moon, and at the commencement of every season and *ayana*.† When this course of sacrifices was thus completed, it was naturally found that the year also had run its course, and the sacrifice and the year, therefore, seem to have early become synonymous terms. There are many passages in the *Brahmanas* and *Sanhitās*, where *samvatsara* and *Yajna* are declared to be convertible terms,‡ and no other theory has yet been suggested on which this may be accounted for. I am therefore inclined to believe that the Vedic Rishis kept up their calendar by performing the corresponding round of sacrifices on the sacred fire that constantly burnt in their houses, like the fire of the Parsi priest in modern times. The numerous sacrificial details, which we find so fully described in the *Brāhmanas*, might be later innovations,

* Ait. Br. Intro. p. 48.

† Cf. Baudhayana Sūtras, ii. 4. 23, which describes the continuous round of sacrifices as follows—अग्न्याधिवसुधैवान्यजसापि नवसि दधेतदग्न्याधिवसमिह च इक्षुर्गन्तासावामवपुःपुनर्वसवसिपावनयोः प्रयत्नान्तास्वान्पुनरुक्ते षडहोता वसति ज्योतिष्टोम इत्येवं सैनमोषणम् । Also compare *Manu* iv. 25-26, and *Yajnavalkya* i. 123.

‡ See Ait. Br. ii. 17, which says, संवत्सरः प्रजापतिः । प्रजापतिर्वजः । Also Ait. Br. iv. 22, *Shatapatha Br.* xi. 1.1.1; 2.7.1. In *Taitt. San.* ii. 5. 7. 3; vii. 5. 7. 4 we have यज्ञो वै प्रजापतिः, and again in vii. 2. 10. 3 संवत्सरः प्रजापतिः ।

but the main idea of the yearly sacrifice appears to be an old one. The etymology of the word *ritu* (*ritu* + *ya*) = season, sacrificer) shows that even in the oldest days there existed a certain correspondence between the sacrifices and the seasons, and what is true of the seasons is true of the year which according to one derivation of *samvatsara* (*vas* = to dwell) is nothing but a period where seasons dwell, or a cycle of seasons.* The priests were not only the sacrificers of the community, but were also its time-keepers,† and these two functions they appear to have blended into one by assigning the commencement of the several sacrifices to the leading days of the year, on the natural ground that if the sacrifices were to be performed they must be performed on the principal days of the year.‡ Some scholars have suggested that the yearly *satras* might have been subsequently invented by the priests. But hypothesis derives little support from the oldest records and traditions of all the sections of the Aryan race. Without a yearly *satra*

* Cf. Bhanu Dikshita's Com. on Amara i. 4.20. Dr. Schrader, in his *Prehistoric Antiquities of the Aryan Peoples*, Part iv., Ch. vi. (p. 305), also makes a similar observation. He holds, on philological grounds, that the conception of the year was already formed in the primeval period by combining into one whole the conception of winter and summer, which he believes to be the two primeval seasons.

† "In Rome the care of the calendar was considered a religious function, and it had from earliest times been placed in the hands of the pontiffs." Lewis's *Historical Survey of the Astronomy of the Ancients*, p. 24.

‡ "Plato states that the months and years are regulated in order that the sacrifices and festivals may correspond with the natural seasons; and Cicero remarks that the system of intercalation was introduced with this object." Lewis's *His Astr. Anc.*, p. 19.

regularly kept up, a Vedic Rishi could hardly have been able to ascertain and measure the course of time in the way he did. When better contrivances were subsequently discovered the sacrifices might naturally become divested of their time-keeping function and the differentiation so caused might have ultimately led to an independent development of both the sacrifices and the calendar. It is to this stage that we must assign the introduction of the numerous details of the yearly sacrifice mentioned in later works; and thus understood, the idea of a sacrifice extending over the whole year, may be safely supposed to have originated in the oldest days of the history of the Aryan race.* In fact, it may be regarded as coeval with, if not antecedent to, the very beginning of the calendar itself.

We have now to examine the principal parts of the year, *alias* the sacrifice. The *savana* or the civil day appears to have been, as its etymology shows,† selected in such cases as the natural unit of time. 30 such days made a month and 12 such months or 360 *savana* days made a year.‡ Comparative Philology, however, shews that the names

* Comparative Philology also points to the same conclusion. Cf. Sanskrit *yaj*, Zend *yaz*, Greek *agos*. It is well-known that the sacrificial system obtained amongst the Greeks, the Romans and the Iranians.

† *Savana* is derived from *su* to sacrifice, and means literally a sacrificial day.

‡ Ait. Br. ii. 17., Taitt. San. ii. 5. 8. 3; Rig. i. 164. 48. Prof. Whitney (Sur. Sid. i. 13, n) observes, "The civil (*savana*) day is the natural day A month of 30 and a year of 360 days are supposed to have formed the basis of the earliest Hindu Chronology, an intercalary month being added once in five years."

for the month and the moon coincide, with occasional small differences of suffix,* in most of the Indo-European languages, and we may therefore conclude that in the primitive Aryan times the month was determined by the moon. Now a month of thirty civil or *advana* days cannot correspond with a lunar synodical month, and the Brahnavādins had therefore to omit a day in some of the *advana* months to secure the concurrence of the civil and the lunar months.† The year of 360 *advana* days was thus practically reduced to a lunar year of 354 civil days or 360 *tithis*. But a further correction was necessary to adjust the lunar with the solar reckoning of time. The zodiac was not yet divided into twelve equal parts, and the solar month, as we now understand it, was unknown. The commencement of the cycle of seasons was, therefore, the only means to correct the calendar, and the ancient Aryas appear to have early hit upon the device of the intercalary days or month for that purpose. There are many passages in the Taittiriya and Vājasaneyi Sanhitas and also one in the Rigveda‡ wherein the intercalary month is mentioned, and though opinions may differ as to when and how it was inserted, we may, for the purpose of our present inquiry, regard it as undisputed that in the old Vedic days means were devised and adopted to secure

* See Dr. Schrader's *Prehistoric Antiquities of the Aryan Peoples*, Part iv., Chap. vi. Translation by Jevons, p. 306. Also Max Müller's *Biographies of Words*, p. 193.

† उत्सवमासोऽवसानमिति मीमांसते ब्रह्मवादिनः। Taitt. San. vii. 5.7.1., and Tāndya Br. v. 10. See also Kala-Madhava Chap. on *Month*, Cal. Ed, p. 63.

‡ Taitt. San. i. 4. 14; Vaj. San. 7. 30; Rig. i. 25. 8. As regards the twelve hallowed (intercalary) nights Cf. Rig. iv. 33. 7; Atha. Veda iv. 11. 11; Taitt. Br. i. 1. 9. 10.

the correspondence of the lunar with the solar year. The occurrence of the twelve hallowed nights amongst the Tenters points to the same conclusion. They were in fact the supplementary days ($366-354=12$) required to balance the lunar with the solar year,—a period when the Ribhus, or the genii of the seasons, slackened their course and enjoyed the hospitality of the sun after toiling for a whole year (Rig. i.33.7.),* and when Prajapati, the God of sacrifices, after finishing the old year's sacrifice, prepared himself for the new year's work (Atharva-Veda iv. 11. 11.). The sacrificial literature of India still preserves the memory of these days by ordaining that a person wishing to perform a yearly sacrifice should devote 12 days (*dvādashāha*) before its commencement, to the preparatory rites. These facts, in my opinion, conclusively establish that the primitive Aryans had solved the problem involved in balancing the solar with the lunar year. There may be some doubt as to whether the concurrence of the two years was at first secured by intercalating twelve days at the end of every lunar year, or whether the days were allowed to accumulate until an intercalary month could be inserted. The former appears to have been the older method, especially as it has been utilised and retained in the performance of early sacrifices; but whichever may be the older method, one thing is certain, that primitive Aryas had contrived means for adjusting the lunar with the solar year. Prof. Weber and Dr. Schrader† appear to doubt the conclusion on the sole ground that we

* See Zimmer's *Life in Ancient India*, p.366; Kaegi's *Rigveda* (translation by Arrowsmith), pp. 20, 37.

† See *Indische Studien*, xiii. 224, and Dr. Schrader's observations thereon in his *Prehistoric Antiquities of Aryan Peoples*, Part iv., Chap. vi., pp. 308-10.

cannot suppose the primitive Aryans to have so far advanced in civilisation as to correctly comprehend such problems. This means that we must refuse to draw legitimate inferences from plain facts when such inferences conflict with our preconceived notions about the primitive Aryan civilization. I am not disposed to follow this method, nor do I think that people, who knew and worked in metals, made clothing of wool, constructed boats, built houses and chariots, performed sacrifices, and had made some advance in agriculture, were incapable of ascertaining the solar and the lunar year. They could not have determined it correct to a fraction of a second as modern astronomers have done; but a rough practical estimate was, certainly, not beyond their powers of comprehension. Dr. Schrader has himself observed that the conception of the year in the primeval period was formed by combining the conceptions of the seasons.† If so, it would not be difficult, even for these primitive Aryans, to perceive that the period of twelve full moons fell short of their seasonal year by twelve days. Dr. Schrader again forgets the fact that it is more convenient, and hence easier and more natural, to make the year begin with a particular season or a fixed position of the sun in the heavens, than to have an ever-varying measure of time like the lunar year. Lewis, in his *Historical Survey of the Astronomy of the Ancients*, quotes Geminus to shew that "the system pursued by the ancient Greeks was to determine their months by the moon and their years by the sun,"‡ and

*For a short summary of the primitive Aryan civilization, see Peile's *Primer of Philology*, pp. 66, 67; also Kaegi's *Rigveda*, translated by Arrowsmith, pp. 11-20.

† See *Preh. Ant. Ary. Peoples* translated by Jevons, p. 305.

‡ Lewis, *Hist. Surv. Astron. Anc.*, p. 18.

this appears to me to have been the system in force in the Indo-Germanic, or at any rate in the primitive Vedic period. There is no other conclusion that we can fairly draw from the facts and passages noted above.

There is, however, a further question, as to whether the solar year, with reference to which these corrections were made, was tropical or sidereal. It is true that the great object of the calendar was to ascertain the proper time of the seasons. But the change in the seasons consequent upon the precession of the equinoxes is so exceedingly minute as to become appreciable only after hundreds of years, and it is more probable than not that it must have escaped the notice of the early observers of the heavens, whose only method of determining the position of the sun in the ecliptic was to observe every morning the fixed stars nearest that luminary.* Under such a system the year would naturally be said to be complete when the sun returned to the same fixed star. Prof. Whitney has pointed out that the same system is followed in the *Surya Siddhanta*, though the motion of the equinoxes was then discovered.† It is, therefore, natural to presume that the early Vedic priests were ignorant of the motion of the equinoxes. No early work makes any mention of or refers to it either expressly or otherwise; and the solar year mentioned in

* Taitt. Br. i. 5. 2. 1; अत्युर्ध्वं नक्षत्रं तद्वहकुर्वीति पशुधनम् । वरा वै सर्वं उदेति । अथ नक्षत्रं नैति । वाचति तत्र सर्वं गच्छेत् । वरं नचन्वं पश्येत् । तद्वहकुर्वीति वत्कारी स्थानम् । पुण्याह एव कुर्वीते । This is still recited at the *Punyaha-vachana* ceremony.

† Sur. Sid. i. 13. n. "It is, however, not the tropical solar year which we employ, but the sidereal, no account being made of the precession of the equinoxes."

the Vedic works must, therefore, be considered as sidereal and not tropical. This would necessitate a change in the beginning of the year every two thousand years or so, to make it correspond with the cycle of natural seasons, and the fact that such changes were introduced twice or thrice is a further proof of the old year being a sidereal one.* The difference between the sidereal and the tropical year is 20.4 minutes, which causes the seasons to fall back nearly one lunar month in about every two thousand years, if the sidereal solar year be taken as the standard of measurement. When these changes and corrections came to be noticed for the first time, they must have created a great surprise, and it was not till after one or two adjustments on this account were made that their true reason, the motion of the equinoxes, could have been discovered. Garga tells us that if the sun were to turn to the north without reaching Dhanishthâ,† it foretold great calamity, and I am disposed to put a similar interpretation upon the story of Prajapati *alias* Yajna *alias* the year, who, contrary to all expectations, moved backwards to his daughter Rohini.‡ But as I wish to examine the tradition more fully hereafter, it is not necessary to dilate on the point here. My object at present is to show that the Vedic solar year was sidereal and not tropical, and what has been said above is, I believe,

* The Krittikâs once headed the list of the Nakshatras, which now begins with Ashvini. Other changes are discussed in the following chapters of this work.

† Garga quoted by Bhattotpala on Brihat. San. iii. 1—

यस्य निवर्ततेऽमासः अविहातुचरावपे ।

आमेवां वसिष्ठेऽमास्तस्य विद्यामहात्मनः ॥

‡ Ait. Br. iii. 33. The passage is discussed in this light further on in Chapter VIII. See also Shat. Br. i. 7. 4. 1.

sufficient to justify such a presumption, at least for the present, though it may afterwards be either retained or discarded, according as it tallies or jars with other facts.

Opinions differ as to whether the lunar month began with the full or the new moon,* and whether the original number of Nakshatras was 27 or 28.† But I pass over these and similar other points as not very relevant to my purpose; and take up next the question of the commencement of the year. I have already stated that the sacrifice and the year were treated as synonymous in old days, and we may, therefore, naturally expect to find that the beginning of the one was also the beginning of the other. The Vedanga Jyotisha makes the year commence with the winter solstice, and there are passages, in the Shrouta Sûtras which lay down that the annual sacrifices like *Yavām-ayana*, should be begun at the same time.‡ A tradition has also been recorded by Jaimini and others that all *Deva* ceremonies should be performed § only during the Uttarayana; and the Uttarayana, according to the several Jyotisha works, || is the period of the year from the winter to the summer solstice,

* See Kala Madhava, Chapter on *Month*, Cal. Ed., p.63; *दीर्घमासं तत्वे भुवेः कदाचि भूयान्*! We can thus explain why the *full moon* night of a month was described as the *first* night of the year. See *infra*.

† Pref. to Rig., Vol. IV., and Whitney's *Essay on the Hindu and Chinese Asterisms*.

‡ See Ved. Jy. 5; Ashvalayana Shr. Su. i. 2. 14. 1; ii. 2. 14. 3 and 22; Kat. Shr. Su. v. 1. 1.

§ Mimamsa Darshana, vi. 8. 5. Ashvalayana, Gr. Su. i. 4. 1, Shatapatha Br. xiv. 2. 3. 1. The last is quoted in Kala Madhava, Chapter on *Yajna*, Cal. Ed., p. 57, but from the Kanva recension thus. *उदयस्येऽश्विनस्य पश्चिम पुनराहो द्वादशाहपक्षस्येति भूत्वा*।

|| Sur. Sid. xiv. 10; Ved. Jy. 5. .

that is, from the time when the sun turns towards the north till it returns towards the south. This leads one to suppose that the winter solstice was the beginning of the year and also of the Uttarayana at the time when the annual sacrifices were established, and therefore in the old Vedic days. But a closer consideration of the ceremonies performed in the yearly *sattras* will show that the winter solstice could not have been the original beginning of these *sattras*. The middle day of the annual *satra* is called the Vishuvan day, and it is expressly stated that this central day divides the *satra* into two equal halves, in the same way as the Vishuvan or the equinoctial day divides the year.* The *satra* was thus the imitation of the year in every respect, and originally it must have corresponded exactly with the course of the year. Now, as *Vishuvan* literally means the time when day and night are of equal length, if we suppose the year to have at the time commenced with the winter solstice, the Vishuvan or the equinoctial day could never have been its central day, and the middle day of the *satra* would correspond, not with the equinoctial, as it should, but with the summer solstice. It might be urged that *Vishuvan*, as referring to the *satra* should be supposed to be used in a secondary sense. But this does not solve the difficulty. It presupposes that *Vishuvan* must have been used at one time in the primary sense (i. e., denoting the time when day and night are equal), and if in its primary sense it was not used with reference to the *satra*, it must have been so used at least with reference to the year. But if *Vishuvan* was thus the central day of the year, the year must have once commenced with the equinoxes. The word *uttarayana* is again susceptible of two interpretations. It

* Ait. Br. iv. 22; Taitt. Br. i. 2. 3. 1; Tan. Br. iv. 7. 1.

may mean "turning towards the north from the southernmost point," or it may indicate "the passage of the sun into the northern hemisphere, i. e., to the north of the equator." If we adopt the first meaning, the Uttarayana and the year must be held to commence from the winter solstice, while if the second interpretation be correct, the Uttarayana and the year must have once commenced with the vernal equinox. The facts, that the central day of the annual *satra* was called *Vishuvan*, that *Vasanta* or spring was considered to be the first of the seasons,* and that the *agrayaneshtis* or the half-yearly sacrifices were required to be performed every *Vasanta* (spring) and *Sharad* (autumn)† clearly shew that the second of the two interpretations given above is more likely to be the older one. Let us, however, examine the point more fully.

The only passages where *uttarayana* is mentioned in the Vedic works are those wherein the white and the black paths for the souls of the deceased, the *Devayana* and the *Pitriyana* are described. The words *devayana* and *pitriyana* occur several times in the *Rigveda*. *Agni* is said to know both these;‡ while in the *Vajasaneyi Samhita* 19. 47, these are said to be the two paths open to mortals. In the *Rigveda* x. 18. 1, the path of the god of Death is said to be the reverse of *devayana*, and in the *Rigveda* x. 98. 11, *Agni* is said to know *devayana* by seasons.§ There is, however,

* *Taitt. Br.* i. 1. 2. 6. कुर्वी वा एतद्वर्णं वदन्तः। Upon this the author of *Kala Madhava* observes लक्ष्मणस्योपनिषदस्यैव वदन्तस्य वाच्यं ब्रह्मण्य। *Cal. Ed.*, p. 59.

† *Ashvalayana Shr. Sut.* i. 2. 9. 3-4.

‡ See *Rig.* i. 72. 7. and x. 2. 7.

§ *विद्यावत् वदुषी देवयानम्।* *Sayana*, however, takes वदुषः with the verb वेह। But query!

no passage in the Rigveda where *devayāna* is fully defined and we have consequently to refer to the passages in the Brihadaranyaka and the Chhandogya Upanishad* for a fuller explanation of these terms. Before the idea was recorded in these works it must undoubtedly have received considerable additions, but nevertheless the original sense cannot be supposed to have been completely lost in these later additions. It is therefore extremely important to see how these two paths are described in the Brahmanas and Upanishads. Brih. vi. 2. 15 and Chh. iv. 15. 5 state that "flame, day, the increasing moon, the six months when the sun is towards the north, the *devaloka* (Chh. *devapatha*) or the abode (Chh. *patha*) of gods, &c.,† is the way never to return; while "smoke, night, the decreasing moon, and the six months when the sun is towards the south, the *pitraloka* or the abode of Pitris" is the reverse. In the Bhagavad Gita viii. 24, 25 we find the same sentiments in modern phraseology, and the question is, what is meant by the phrase "the six months when the sun is towards the north" or, as Yaska and the Gita have it, "the six months of the Uttarayana." Almost all the commentators have interpreted the expression to mean the six months from the winter to

* See also Yaska's Nirukta 14. 9; Mahanarayanopaniṣad 25. 1; and Shankaracharya's Bhashya on Brahma-sūtras iv. 2. 18-21, where all such passages are collected and discussed.

† अग्निदीप्तिरह्म आपूर्वमात्रपक्षमापूर्वमात्रपक्षमासावुद्विगृह्यति इति नास्ती-शी देवलोकं... तेषां न पुनरावृत्तिः । धूम्राद्याग्निं रात्रेरपक्षीयमात्रपक्षमा-शीयमात्रपक्षमात्रपक्षमासावुद्विगृह्यति इति नास्ती-श्चः पितृलोकम्... । Brihadar. vi. 2. 15. Instead of "six months when the sun goes north and south," Yaska and Mahana. use the words उदयमग्न and अस्तमग्न while in Chh. we have देवपथ instead of देवलोक in Brihad. In Kaṇva i. 3, it is called देवयान.

‡ अग्निदीप्तिरह्मः धूमः पक्षमासा उत्तरायणम् । Gita viii. 24.

the summer solstice. But notwithstanding their high authority it will be found that their interpretation, though in consonance with the later astronomical view, is directly opposed to the passages in the Vedic works. In the Taittiriya Samhita vi. 5, 3, we are told "the sun, therefore, goes by the south for six months and six by the north." But this does not help us in ascertaining the correct meaning of the phrase "by the north." As it stands it may mean either the solstitial or the equinoctial six months. We must therefore look for another passage, and this we find in the Shatapatha Brahmana (ii. 1. 3. 1-3), where in describing the two aforesaid paths it lays down in distinct terms that Vasanta, Grishma and Varsha are the seasons of the Devas; Sharad, Hemanta and Shishira those of the Pitris; the increasing fortnight is of the Devas; the decreasing one of the Pitris; the day is of the Devas; the night of the Pitris; again the first part of the day is of the Devas; the latter of the Pitris.....When he (the sun) turns to the north, he is amongst the Devas and protects them; when he turns to the south he is amongst the Pitris and protects them."† This removes all doubts as to what we are to understand by *devayana*, *devapatha*, or *devaloka* and *uttarayana* as connected with it. The Brihadaranyaka Upanishad is a part of the Shatapatha Brahmana, and we shall not be violating any rule of interpretation if we interpret the passage in the one

*Shankaracharya is not explicit; yet his reference to the death of Bhishma shows that he takes the same view. Anandagiri on Prashnopanishad i. 9, says उच्चैर्हविरेक्षिणावन्न ।

† As the passage is important I give it here in full—

वसन्ते जीष्मो वर्षा । ते देवा वसन्तः सरदेयतः शिशिरस्ते पितरो व श्रवणं
मैश्वर्यातः स देवा जीष्मसीवते स पितरोऽश्वि देवा रात्रिः पितरः पुनरहः
पूर्वाह्णे देवा भवराहः पितरः... । स वर्ष उदगावर्तते देवेषु तर्हि भवति देवस्तस्य-
विशोपावर्तयेत् स व इक्षिणावर्तते पितॄषु तर्हि भवति भवति पितॄस्तस्य विशोपावर्तते ।

in the light of a similar passage in the other. Now if Vasanta (spring), Grishma (summer), and Varsha (rains) were the seasons of the Devas, and the sun moved amongst the Devas when he turned to the north, it is impossible to maintain that the Dakṣayana or the Utterayana ever commenced with the winter solstice, for in neither hemisphere the winter solstice marks the beginning of spring, the first of the Deva seasons. The seasons in Central Asia and India differ. Thus the rains in India commence about or after the summer solstice, while in the plains of Asia the season occurs about the autumnal equinox. But in neither case Vasanta (spring) commences with the winter solstice or Varsha (rains) ends at the summer solstice. We must therefore hold that *devayana* in those days was understood to extend over the six months of the year, which comprised the three seasons of spring, summer, and rains, i. e. from the vernal to the autumnal equinox, when the sun was in the northern hemisphere or to the north of the equator. This shows further that the oldest order of seasons did not place Varsha (rains) at the summer solstice, when the chief Indian monsoon commences; but at the autumnal equinox. The winter solstice, according to this order, falls in the middle of Hemanta. In the modern astronomical works, the winter solstice is, however, placed at the end and not in the middle of Hemanta, while the vernal equinox is said to fall in the middle of Vasanta. When the Vedic Aryas became settled in India, such a change in the old order of seasons was necessary to make them correspond with the real aspect of nature. But it is difficult to determine exactly when this change was made.* The old order of seasons

* See Zimmer's *Life in Ancient India*, p. 371. Kaegi's *Rig-veda*, p. 116, note 66.

given in the passage above quoted, however, clearly states that Vasanta in old days commenced with the vernal equinox. We can now understand why Vasanta has been spoken of as the first season and why the Nakshatras have been divided into two groups called the Deva Nakshatras and the Yama Nakshatras.* I am aware of the theory which attempts to explain away the passages above cited as metaphorical to avoid the appearance of superstition.† But the method is neither sound nor necessary. The path of the Devas and the path of the Pitris are several times referred to in the R̥gveda, and though we might suppose the Brahnavadins to have developed the two ideas to their utmost extent, it cannot be denied that the original idea is an old one, suggested by the passage of the sun in the northern and southern hemispheres.

In the absence of anything to the contrary we might therefore take it as established that in the early Vedic days the year began when the sun was in the vernal equinox; and as the sun then passed from the south to the north of the equator it was also the commencement of his northern passage. In other words, the Uttarayana (if such a word was then used), Vasanta, the year and the S̥utras all commenced together at the vernal equinox. The autumnal equinox which came after the rains was the central day of the year; and the latter half of the year was named the Pitriyana or what we would now call the Dakshinayana. It is difficult to definitely ascertain the time when the commencement of the year was changed from the vernal equinox to the winter solstice. But the change must have been introduced long before the vernal equinox was in the Krit-

* Taitt. Br. i. 1.2.6. and i. 5.2.6.

† See Thomson's Bhagavad Gita, p. 60.

times, and when this change was made *uttarayana* have gradually come to denote the first half of the new year, i. e., the period from the winter to the summer solstice, especially as the word itself was capable of being understood in the sense of "turning towards the north from the southernmost point." I am of opinion, however, that *devayana* and *pitriyana*, or *devaloka* and *pitriloka* were the only terms used in the oldest times. It is a natural inference from the fact that the word *uttarayana*, as such, does not occur in the Rigveda. The fact, that Visuvan was the central day of the yearly *satra*, further shows that the sacrificial system was coeval with the division of the year into the paths of Devas and Pitris. After a certain period the beginning of the year was changed to the winter solstice, and it was sometime after this change was made that the words *uttarayana* and *dakshinayana* came to be used to denote the solstitial divisions of the year. But *devayana* and *pitriyana* could not be at once divested of the ideas which had already become associated with them. Thus while new feasts and sacrifices came to be regulated according to *uttarayana* and *dakshinayana*, *devayana* and *pitriyana* with all the associated ideas continued to exist by the side of the new system, until they became either gradually assimilated with the new system or the priests reconciled the new and the old systems by allowing option to individuals to follow whichever they deemed best. We must therefore take great care not to allow the idea of *uttarayana*, as we now understand it, to obscure our vision in interpreting the early Vedic traditions, and that too much care can never be taken is evident from the fact that even so acute an astronomer as Bhaskaracharya was at a loss to correctly understand the tradition that the Ut-

Uttarayana was the day of the Devas. In his *Siddhanta Shiromani* he raises the question how the Uttarayana, as it was generally understood in his day, could be the day of the Devas? He admits that the celestial beings on Meru at the North Pole behold the sun (during all the six months) when he is in the northern hemisphere (viz. 9) and these six months may therefore be properly called their day.* But the word *uttarayana* was then used to denote the period of six months from the winter to the summer solstice; and Bhaskaracharya was unable to understand how such an Uttarayana could be called the day of the Devas by the writers of the astronomical *Sanhitas*. If the sun is visible to the Gods at Meru from the vernal equinox to the summer solstice, its passage back to the autumnal equinox lies through the same latitudes and in that passage, i. e., during the three months after the summer solstice, the sun must, says Bhaskaracharya, be visible to the Gods. But according to the *Sanhita*-writers the day of the Devas ended with the Uttarayana, that is, as Bhaskara understood the word, at the summer solstice. How is this conflict to be reconciled? Bhaskaracharya could give no satisfactory solution of the difficulty, and asks his readers to reconcile the conflicting statements on the supposition that the doctrine may be regarded as referring to "judicial astrology

* In the *Surya Siddhanta* xii. 67 it is said that "At Meru Gods behold the sun, after but a single rising, during the half of his revolution beginning with Aries," while in xiv. 9. the Uttarayana is said to commence "from the sun's entrance into Capricorn." The author, however, has not noticed the tradition that the Uttarayana is the day of the Devas and the apparent inconsistency arising therefrom. Perhaps he understood the tradition in its true sense.

and the fruits it foretells.* Had Bhaskaracharya however known that the word *uttarayana* was sometimes used for *devayana* to denote the passage of the sun from the vernal to the autumnal equinox, I am sure, he would not have asked us to be satisfied with the lame explanation that the doctrine of the Sanhita-writers need not be mathematically correct as it refers exclusively to judicial astrology. It is difficult to say whether the ancient Aryas ever lived so near the north pole as to be aware of the existence of a day extending over at least two or three if not six months of the year. But the idea that the day of the Devas commences when the sun passes to the north of the equator appears to be an old one. In the Taittiriya Brahmana† iii. 9. 22. 1. we are told that the year is but a day of the Devas and

* The original verses are as follow—

दिनं वराणामवनं बहुसरं निद्योतरसांहितिकैः प्रकीर्तितम् ।
 दिग्गन्धुल्लेखैर्दिनमेव तन्मतं निशा तथा तत्फलक्रीतवाचकम् ॥
 इहांतमारीशति वैः क्रमेण तेरेव दुत्तरवरीहतीनः ।
 बचेव इष्टः प्रथमं स देवेस्तमेव तिष्ठन् न विलोक्यते किम् ॥

Go'dhyaya vii.11-12, Bapudevashastri's Ed. pp. 304, 5.

† एकं वा एतद्विधानामहः । वरसेवासरः । It is however extremely hazardous to base any theory upon this. Traditions like these have been cited as indicating the fact that the North Pole was inhabited in old days! Similar other traditions are said to indicate the existence of a pre-glacial period. Is it not more probable to suppose that when *uttarayana* and *dakshinayana* came to be first distinguished, they were respectively named 'day' and 'night' with a qualifying word to mark their special nature? The history of languages shews that when people come across new ideas they try to name them in old words. The *Uttarayana* and the *Dakshinayana* may have been thus conceived as Gods' day and night. See *infra* Chap. V.

even Herodotus (400 B. C.) mentions a people who sleep during the six months of the year.* If the tradition is, therefore, as old as it is represented to be, it is impossible to reconcile it with the latter meaning of *uttarayana* as commencing from the winter solstice and this would then furnish an additional ground to hold that in early times the *Uttarayana* began with the vernal equinox as stated in the *Shatapatha Brahmana*.

I have stated above that when the commencement of the year was altered from the vernal equinox to the winter solstice, *uttarayana* either lost its older meaning or was rather used to denote the solstitial division of the year. But this is not the only consequence of that change. With the year the beginning of the annual *satras* was also gradually transferred to the winter solstice and the change was complete when the *Taittiriya Sanhita* was compiled. In fact had it not been for the passage in the *Shatapatha Brahmana* it would have been impossible to produce any direct evidence of the older practice. When the beginning of the *satra* was thus changed, the *Vishuvan* day must have gradually lost its primary meaning and come to denote simply the central day of the yearly *satra*.

The old practice was not however completely forgotten and for the purpose of the *Nakshatra*-sacrifices the vernal equinox was still taken as the starting point. Thus it is that *Garga* tells us that "of all the *Nakshatras* the *Krittikas* are said to be the first for sacrificial purposes and *Shravishta* for (civil) enumeration."† But even this distine-

*Quoted in Narrien's *Origin and Progress of Astronomy*, p.31.

†Quoted by Somakara on *Ved. Jy.* 5. तेषां च सर्वेषां नक्षत्राणां कर्त्तुं कृत्तिकाः प्रथममाचक्षते अविष्टा तु संप्रदायाः ।

tion appears to have been eventually lost sight of by the later writers and all references to *uttarayana* were understood to be made solely to the six months from the winter to the summer solstice, an error from which even Bhaskaracharya did not escape, though he perceived the absurdity caused by it in some cases. At the present day we on the southern side of the Narmada begin the year at the vernal equinox for all civil purposes, but still all the religious ceremonies prescribed to be performed in the *Uttarayana*, are performed during *Uttarayana* beginning with the winter solstice, a position quite the reverse of that described by Garga. When we at the present day have been thus using the system of a double year-beginning, we need not be surprised if the ancient Aryas, after shifting the commencement of the year to the winter solstice, managed to keep up the old and the new system together by assigning the different beginnings of the year to different purposes as indicated by Garga. It was the only alternative possible if nothing old was to be entirely given up.

CHAPTER III.

Krittikas.

Nakshatras in old Vedic times generally mean asterisms and not zodiacal portions—The present and the older position of the solstices—In later works—In Vedāṅga Jyotiṣha—An objection against its antiquity examined—Passages in the Taittiriya Saṁhita and Brāhmaṇa—The Krittikas head the Nakshatras—Deva and Yama Nakshatras—Their real meaning—Taittiriya Saṁhita vii. 4. 8 discussed—Jaimini's and Śhābara's interpretation of the same—Conclusions deducible therefrom—Winter solstice in Magha—Vernal equinox in the Krittikas—The age of the Saṁhita—2350 B. C.—Bentley's arguments and views criticised.

WE HAVE seen that the ancient Aryas originally commenced their year, which was luni-solar and sidereal, with the vernal equinox, and that when the beginning was changed to the winter solstice both the reckonings were kept up, the one for sacrificial and the other for civil purposes. Let us now examine if there is any reliable evidence to show that the Vedic priests made any corrections in the calendar when by the precession of the equinoxes the cycle of seasons gradually fell back. All our present calendars are prepared on the supposition that the vernal equinox still coincides with the end of Revati and our enumeration of the Nakshatras begins with Ashvini, though the equinox has now receded about 18° from Revati. It has been shown by Prof. Whitney (Surya Siddhanta viii. 9 note, p. 211) that the above position of the vernal equinox may be assumed to be true at about 490 A.D. Taking this as the probable date of the introduction of the present system, we have now to see if we can trace back the position of the vernal equinox amongst the fixed circle of stars. The question, so far as

one antecedent stage is concerned, has been thoroughly discussed by Colbrooke, Bentley, Max Müller, Weber, Whitney, Biot and other scholars, and I shall therefore only summarise what they have said, noting the points where I differ from them. I do not propose to enter into any detailed mathematical calculations at this stage of the inquiry, for I am of opinion that until we have thoroughly examined and discussed all the passages in the Vedic works bearing on this question, and settled and arranged our facts, it is useless to go into minute numerical calculations. The Vedic observations could not again be such as need any minute or detailed arithmetical operations. I shall therefore adopt for the present the simplest possible method of calculation,—a method which may be easily understood and followed by any one, who can watch and observe the stars after the manner of the ancient priests. We shall assume that the zodiac was divided into 27 parts, not by compass but, by means of the leading stars, which Prof. Max Müller rightly calls the milestones of the heavens. The Vedic priest, who ascertained the motion of the sun by observing with his unaided eye the nearest visible star,* cannot be supposed to have followed a different method in making other celestial observations; and, if so, we cannot assume that he was capable of recognizing and using for the purposes of observation any artificial divisions of the ecliptic on a mathematical principle, such as those which would result from the division of 360° of the zodiac into 27 equal parts, each part thus extending over $13^\circ 20'$ of the ecliptic. Of course, such an artificial method might be easily

* Taitt. Br. i. 5. 2. 1, previously quoted. The passage is very important as it describes the method of making celestial observations in old times.

followed in later days, when the means of observation increased and the science of arithmetic was developed. But in the earliest days of civilization, it is more natural to suppose that the motions of the sun and the moon were determined by observing which of the known fixed stars was nearest to them. When we, therefore, find it stated in the Vedic works that the sun was in the Krittikas, it is more probable that the fixed asterism, and not the beginning of the artificial portion of the zodiac, was intended. I admit that the accuracy of such observations cannot be relied upon within two or three degrees, if not more. But we must take the facts as they are, especially when it is impossible to get anything more accurate from the ancient observers of the heavens.* It will, I trust, however, be found that this inevitable want of accuracy in the old observations does not affect our conclusions to such an extent as to make them practically useless for chronological purposes. For instance, suppose that there is a mistake of 5° in observing the position of the sun with reference to a fixed star when the day and the night are of equal length. This would cause an error of not more than $5 \times 72 = 360$ years in our calculations; and in the absence of better means there is no reason to be dissatisfied even with such a result, especially when we are dealing with the remotest periods of antiquity. I shall, therefore, assume that references to the Nakshatras in the old Vedic works, especially in cases where the motions of other bodies are referred to them, are to the fixed

* Similar observations have been recorded by Greek poets. Homer mentions 'the turns of the sun,' and Hesiod 'the rising and the setting of the Pleiades at the beginnings of day and night.' The observations in the Vedic works may be supposed to have been made in a similar way.

asterisms and not to the zodiacal portions. I may also state here that as a change in the position of the vernal equinox necessarily causes a similar change in the position of the winter solstice, both the beginnings of the year, previously referred to, would require to be simultaneously altered. Whenever, therefore, we find a change in the position of the vernal equinox recorded in the early works, we must look for the evidence of a corresponding alteration in the position of the winter solstice, and the corroborative evidence so supplied will naturally add to the strength of our conclusions. This will, I hope, sufficiently explain the procedure I mean to follow in the investigation of the problem before us. I shall now proceed to examine the passages which place the vernal equinox in the *Krittikas*, beginning with the latest writer on the subject.

It is now well-known that Varahamihira, in whose time the vernal equinox coincided with the end of Revati and the summer solstice was in Punarvasu, distinctly refers in two places to the older position of the solstices recorded by writers who preceded him. "When the return of the sun took place from the middle of Ashlesha," says he in his *Pancha Siddhantika*; "the tropic was then right. It now takes place from Punarvasu."* And, again, in the *Brihat Sanhita* iii., 1 and 2, he mentions the same older position of both the solstitial points and appeals to his readers to ascertain for themselves by actual observation which of the two positions of the solstices is the correct one, whether the

*See Colebrooke's *Essays*, Vol. II., p. 387. The verse may now be found in Dr. Thibaut's edition of the work. It is as follows—

भावेऽश्लेषायां सूर्या निवृत्तिः किलोष्णकिरणम् ।
 पुनर्वसुर्न सप्तमीस्ताम्रतनयं पुनर्वसुतः ॥

older position of the solstices or that given by "the writer."* It is clear, therefore, that in the days of Varahamihira, there existed works which placed the winter solstice in the beginning of (divisional) Dhanishtha and the summer solstice in the middle of Ashlesha. This statement of Varahamihira is fully corroborated by quotations from Garga† and Parashara which we meet with in the works of the later commentators; and it appears that the system of commencing the year with the month of Magha, which corresponds with the above position of the solstices, was once actually in vogue. Amarasinha states that the seasons comprise two months each, beginning with Magha, and three such seasons make an *ayana*.‡ The same arrangement of seasons is also mentioned in the medical works of Sushruta and Vagbhata.§ The account of the death of Bhishma, related in the Mahabharata Anushasana-parva 167, further shows that the old warrior, who possessed the superhuman power of choosing his time of death, was waiting on his death-bed for the return of the sun towards the north from the winter

* Thus—

आग्नेयार्धोदक्षिणमुत्तरयवनं रवेर्बनिष्ठावत्॥

नूनं कस्यचिदासीद्येनोक्तं पूर्वशास्त्रेभु॥

संप्रत्ययवनं सविनुः क्रकटकायं स्यादित्यान्वयः॥

उक्तानासौ विवृजितः प्रत्यक्षपरिक्तयेर्वन्तिः॥

† Garga, quoted by Somakara on *Ved. Jy.* 5, says—

यदा नावस्व सुरुस्व प्रतिपद्युत्तरयवनम्॥

सहोदयं अविष्टायिः सोमार्को प्रतिपद्यतः॥

Bhattotpala on *Brihat San.* iii. 1, quotes Garga as follows—

अविष्टायोत्पान्नायै चरतः पितरिः॥

‡ *Amara* i. 4. 13 द्वौ द्वौ मानादिनासौ स्यादुत्तरयवनं विभिः॥

§ See *Sushruta* i. 6, and *Vagbhata's Ashianga-hridaya Sutra* sthana iii. 2; both of which are quoted further on in Chap. IV.

solstice and* that this auspicious event took place in the first half of the month of Magha.* It is evident from this that the winter solstice must have coincided in those days with the beginning of Dhanishtha as described in the Vedanga Jyotisha and other works.

There is thus sufficient independent evidence to show that before the Hindus began to make their measurements from the vernal equinox in Revati there existed a system in which the year commenced with the winter solstice in the month of Magha and the vernal equinox was in the last quarter of Bharani or the beginning of the Krittikas.† We need not, therefore, have any doubts about the authenticity of a work which describes this older system and gives rules of preparing a calendar accordingly. Now this is what the Vedanga Jyotisha has done. It is a small treatise on the Vedic calendar, and though some of its verses still remain unintelligible, yet we now know enough of the work to ascertain the nature of the calculations given therein. It was once supposed that the treatise mentions the *Rashis*,

* *Mah. Anu.* 167, 26 and 28—

परिवृत्ती हि नक्षत्रान्सहस्रांश्चरिषाकरः ॥ २६ ॥

माघोऽयं सवनप्रागः माघः सौम्यो युधिष्ठिर ।

विभागाद्यैः पक्षोऽयं शुक्लो भवितुमर्हति ॥ २८ ॥

Lele, Modak, Ketkar and other Hindu astronomers have recently tried to determine the date of the Mahabharata war from such references, and they hold that the vernal equinox was then in the Krittikas.

† Prof. Max Mullar has pointed out that in the Atharva Veda i 19. 7 and in the Yajur Veda Smṛiti i 267, the Krittikas occupy their early position, while the Vishnu Purana actually places the vernal equinox in the Krittikas. See Pref. to Rig., Vol. IV., p. xxxi.

but a further study of the work has shown that though the word *Rashi* occurs in some of its verses, it is there used in a totally different sense. This work gives the following positions of the solstices and the equinoxes—*

1. The winter solstice in the beginning of Shrāvishta, (divisional);
2. The vernal equinox in 10° of Bharani;
3. The summer solstice in the middle of Ashlesha, and—
4. The autumnal equinox in 3° 20' of Vishakha.

The first year of the cycle commenced with the winter solstice* when the sun and the moon were together at the beginning of Dhanishtha and the Uttarayana also began at the same time. There is very little else in the Vedanga Jyotisha that may help us in our present inquiry except the fact that the enumeration of the deities presiding over the various Nakshatras begins with Agni, the presiding deity of the Krittikast†. From these data astronomers have calculated that the solstitial colure occupied the position above mentioned between 1269 B. C. to 1181 B. C., according as we take the mean rate of the precession of the equinoxes 50" or 48".6 a year.‡

Some scholars, however, have boldly raised the question, what authority is there to hold that the position of the solstitial colure was recorded in the Vedanga Jyotisha from

* See *Ved. Jy.* Verse 5.—

प्रपद्यते अविष्टासौ सूर्याचंद्रमसाबुधकः ।
सार्पार्थे दक्षिणार्कस्तु मायभाषणस्तु सदा ॥

† Cf. *Ved. Jy.* Verse 25. अग्निः प्रजापतिः सोमो &c.,

‡ See the late Krishnashastri Godbole's *Essay on the Antiquity of the Vedas*, p. 18; also *Pref. to Rig.*, Vol. IV., p. xxviii.

actual observation? It is conceded that the position of the solstitial colure might have been incorporated in the Jyotisha from real traditional information, but it is at the same time contended that the language of the treatise and the methods given therein create doubts about the antiquity claimed for the work on the strength of the position of the solstitial points given therein. "I feel bound to remark," says Prof. Max Muller, "that unless there was internal evidence that the Vedic hymns reached back to that remote antiquity this passage in the Jyotisha would by itself carry no weight whatever*." The existence of the different versions of the Vedanga Jyotisha and the obscurity into which some of its verses are still shrouded render it rather difficult to meet the above objection, especially as it is a side attack on the antiquity of the work with an admission that the position of the colure might have been recorded in the work from real traditions current in the time of its author. It is, however, needless to answer this objection, inasmuch as there is ample confirmatory evidence in the Vedic works themselves which not only bears out the statement in the Vedanga Jyotisha, but takes us back into still remoter antiquity.

There are many passages in the Taittiriya Sanhita, the Taittiriya Brahmana and other works where the Krittikas occupy the first place in the list of the Nakshatras.† In the Taittiriya Brahmana (i. 1, 2, 1) it is distinctly stated

* See Pref. to *Rig.*, Vol. IV., p. xxv. The mention of *ज्योतिष* for *अथर्व* first in the list of symbolic representations of the Nakshatras in verse 14, lends some support to these doubts.

† These together with the list, will be found in Pref. to *Rig.*, Vol. IV., p. xxxiv. Cf. *Taitt. San.* iv., 4. 10; *Taitt. Br.* iii. 1. 1. 6 and i. 5. 1. 2.

"one should consecrate the (sacred) fire in the Krittikas; ...the Krittikas are the mouth of the Nakshatras."* This shows that the first place given to the Krittikas in the list of the Nakshatras is not accidental and that we must at least suppose that the Krittikas were the "mouth of the Nakshatras," in the same way as Vasanta or spring was the "mouth of the seasons"† or the Phalguni full moon the "mouth of the year."‡ The phrase is the same in all places and naturally enough it must be similarly interpreted. But granting that the Krittikas were the mouth of the Nakshatras in the sense that their list always commenced with them it may be asked what position we are to assign to the Krittikas in the course of the year. There were, as I have previously shown, two beginnings of the year, the winter solstice and the vernal equinox; which of these two corresponded with the Krittikas? Or, are they to be supposed to have coincided with a point altogether different from these two? A little consideration will show that it is not difficult to answer these questions satisfactorily. The present distance between the Krittikas and the summer solstice is more than 30° , and if they ever coincided with the summer solstice it must have been long ago in the present cycle of the precession of the equinoxes. We cannot therefore interpret the above passage so as to place the summer solstice in the Krittikas, unless we are prepared to take back the composition of the Taittiriya Sanhita to about 22,000 B. C., and further suppose that all evidence of the intermediate astronomical observations is entirely lost, and the same thing may be said against placing the Krittikas

* कृत्तिकारविमिवधीव।.....। कुर्वन् वा दत्तवज्रवापां नक्षत्रिकः।

† Taitt. Br. i. 1. 2. 6 कुर्वन् वा दत्तवज्रं नक्षत्रिकः।

‡ Taitt San vii 4 8 quoted *infra*.

in the autumnal equinox.* Both the suggestions in my opinion are too extravagant to deserve any consideration. Nor can we assign the beginning of the Nakshatras to any random point in the ecliptic. There thus remain two possible explanations: viz., that the Krittikas coincided either with the winter solstice, or with the vernal equinox. Now, considering the fact that the vernal equinox is placed in the last quarter of Bharanī in the Vedāṅga Jyotiṣha it is more natural to presume that the vernal equinox coincided with the Krittikas at the time when the Taittiriya Saṁhita was compiled. But we need not depend upon probabilities like these, when there are other passages in the Taittiriya Saṁhita and Brahmana which serve to clearly define the position of the Krittikas in those days.

In the Taittiriya Brahmana (i. 5, 2, 7) it is stated that "the Nakshatras are the houses of gods . . . the Nakshatras of the Devas begin with the Krittikas and end with Viśvakha, whereas the Nakshatras of Yama begin with the Anurādhā and end with the Apa-Bharanī."† Prof. Max Müller appears to think that the latter group is called the Nakshatras of Yama because Yama presides over the last of them.‡ But the explanation appears to me to be quite unsatisfactory; for on the same principle the first group should have been called the Nakshatras of Indragṇi, the presiding deities of Viśvakha, the last in that group. I am, there-

* A similar mistake is committed by the late Krishna Shastri Godhale, in his essay on the *Antiquity of the Vedas*, where he supposes Mrigashiras to be in the autumnal equinox. p. 20, 21.

† वेदसूक्तैः नक्षत्राणि । . . . । कृत्तिकाः श्रवणं । विश्वतोऽश्रवणं । ज्ञानि देवमक्षयानि । अनुराधाः श्रवणं । अपभरणीरुतनं । ज्ञानि यममक्षयानि । यानि देवमक्षयानि तानि कृत्तिकेन कृत्तिकेति । यानि यममक्षयानि तान्मुक्तेन ।

‡ Pref. to Rig. Vol. IV. p. xxxi.

fore, disposed to think that the principle of division in this case is the same as that followed in the case of the Devayana and the Pitriyana discussed before. We have the express authority of the Shatapatha Brahmana stating that the sun was to be considered as moving amongst and protecting the Devas, when he turned to the north, in the three seasons of spring, summer and rains. In other words the hemisphere to the north of the equator was supposed to be consecrated to the Devas and the southern one to the Pitris. Now, the sun moved amongst the Devas when he was in the northern hemisphere. The Devas, therefore, must have their abode in that hemisphere, and as the Nakshatras are said to be the houses of the Devas, all the Nakshatras in the northern hemisphere, from the vernal to the autumnal equinox, would naturally be called the Nakshatras of the Devas. Now the southern hemisphere was assigned to the Pitris; but I have already quoted a passage from the Rigveda which states that it was the path of the god of death. In Rig. x. 14. 1, Yama is spoken of as the king of Pitris, and in verse 7 of the same hymn the deceased is told to go to the *pitri-loka*, where he would meet the god Yama. In the Vajasaneyi Sanhita 19, 45, salutation is made to the world of Pitris in the kingdom of Yama. There are many other passages of similar import in the Sanhitas,* and from all these it would be quite clear that the Pitriyana or Pitri-loka was also called the kingdom of Yama. The Nakshatras in the southern hemisphere, therefore, came to be designated as the Nakshatras of Yama in opposition to the Nakshatras of the Devas, thus dividing the whole circle of stars in two equal groups. This also explains why Yama is made to preside

* Cf *Taitt. San.* vii. 3, 14. 'मृत्योर् यामा मनुजानां' (मृत्योर् यामा मनुजानां). Also see. *Athar. Ved* xviii. 4.

over the Apa-Bharanis. It was at the Apa-Bharanis that the zodiac was divided, the Krittikas going over into the Devas' and the Apa-Bharanis turning down into the Yama's portion of the celestial hemisphere.* The Taittiriya Brahmana further states that the Nakshatras of the Devas move towards the south while the Nakshatras of Yama move towards the north. The words *dakshina* (south) and *uttara* (north) are in the instrumental case, and doubts have been entertained as to their exact meaning. But if we accept the statement in the Shatapatha Brahmana about the abode of the Devas, no other meaning is possible except that the Nakshatras of the Devas were counted from the vernal to the autumnal equinox, that is, to the point where the south (southern hemisphere) begins, and conversely in the case of the Nakshatras of Yama. I may here mention that the movements of both the groups are described in the Brahmana in the present tense (*pari-yanti*), and that we may, therefore, suppose them to be recorded from actual observation. If this explanation of the division of the Nakshatras into the Nakshatras of gods and those of Yama is correct—and I think it is—it at once fixes the position of the Krittikas at the beginning of the Devayana or the vernal equinox at the time when these Vedic works were compiled.

There is another and still more important passage in the Taittiriya Sanhita which supplies further confirmatory evidence on the same point. In the Taittiriya Sanhita vii. 4. 8,

* May not Apa-Bharanis have been so named from this circumstance? Bharani appears to be an older name, changed afterwards into Apa-Bharani in the same manner Mula into Mula-bharani and Jyeshtha into Jyeshthaghani. Perhaps the description of Apa-Bharani in Taitt, Br. i. 5. 1, may be so understood. It says—
 अमस्यापभरणीः । अपकर्षेतः परस्तात् । अपवर्हंतोऽवस्तात् ।

we have a discussion as to the time best suited for the commencement of the *Satras* like the *gavam-ayana* which last for one whole year and as the passage is important in various ways I shall give it here in the original—

संवत्सराय दीक्षिष्यमाणाएकाष्टकायां दीक्षेरन्नेषा वै संवत्सरस्य पत्नी वदेकाष्टकैतस्यां वषट्कृता रात्रिं वसति साक्षादेव संवत्सरमारभ्य दीक्षितवर्तव्येति संवत्सरस्याभिदीक्षते वषट्काष्टकायां दीक्षिते तन्नामानावुत् भवतोव्यस्तं वापुते संवत्सरस्वभिदीक्षते वषट्काष्टकायां दीक्षिते तन्नामानावुत् भवतः कल्मुनीपूर्णमासे दीक्षेरन्मुखं वापुतत् संवत्सरस्य यत्कल्मुनीपूर्णमासे मुखतएव संवत्सरमारभ्य दीक्षते तस्यैव निर्या यत्साम्ये विष्वान्संपद्यते चित्रापूर्णमासे दीक्षेरन्मुखं वापुतत्संवत्सरस्य कच्चित्रापूर्णमासे मुखतएव संवत्सरमारभ्य दीक्षते तस्य न कात्वन निर्या भवति चतुरहे पुरस्तात्पौर्णमास्ये दीक्षेरन्तेषामेका कायां कयः संपद्यते तेनेकाष्टकां न छन्दकुर्वति तेषां पूर्वपक्षे छुत्वा संपद्यते पूर्वपक्षे मासी अभिसंपद्यते ते पूर्वपक्ष उत्तिष्ठति ताम्रुतिष्ठतओषधयो वनस्पतयो नृतिष्ठति ताम्कस्याणी कीर्तिरनृतिष्ठत्यरात्पुरिमे यजमाना इति तदनुसर्वं रात्रुर्वति ।

In the *Tandya Brahmana* (v. 9) we have the same passage with a few additions and alterations, and as this has been quoted by the commentators I shall give it here for comparison—

एकाष्टकायां दीक्षेरन् ॥

एषा वै संवत्सरस्य पत्नी वदेकाष्टकैतस्यां वापुता रात्रिं

वसति साक्षादेव तत्संवत्सरमारभ्य दीक्षते ॥ २ ॥

तस्य सा निर्या यत्सोऽवनिर्दिशतेऽभ्यवसन्ति ॥ ३ ॥

विचिह्नं वा एते संवत्सरस्याभिदीक्षन्ते यत्काष्ठकायां दीक्षन्तेऽत-

नामानावृत् मवतः ॥ ४ ॥

अर्तं वदन्ते संवत्सरस्याभिदीक्षन्ते येऽतन्मावावृत् आभिदीक्ष-

ते ॥ ५ ॥

तस्मादेकाष्टकायां न दीक्ष्यम् ॥ ६ ॥

फाल्गुने दीक्षेरन् ॥ ७ ॥

मुखं वा एतत्संवत्सरस्य यत्फाल्गुनी मुच्यते तत् संवत्सर-

मारभ्य दीक्षन्ते ॥ ८ ॥

तस्य सा निर्या यत्सम्बन्धे विषुवान् संपद्यते ॥ ९ ॥

चित्रापूर्वमासे दीक्षेरन् ॥ १० ॥

चक्षुर्वा एतत् संवत्सरस्य यत्चित्रापूर्वमासो मुच्यते वै चक्षुर्मुखत-

एव तत् संवत्सरस्याभ्यव दीक्षन्ते तस्य न निर्यास्ति ॥ ११ ॥

चतुरश्रे पुरस्तात् पूर्वमास्या दीक्षेरन् ॥ १२ ॥

तेषामेकाष्टकायां कयः संपद्यते तेनैकाष्टकां न संवट् कु-

र्वति ॥ १३ ॥

तेषां पूर्वपक्षे सुत्या संपद्यते पूर्वपक्षे मासाः संतिष्ठन्नाना यन्ति

पूर्वपक्ष उतिष्ठन्ति तान्मुत्तिष्ठतः पशवः ओषधयोऽनुत्तिष्ठन्ति

तान्कल्पाणी वागभिवदत्यरात्सुरिषे सन्निगदति ते राघु-

र्वन्ति ॥ १४ ॥

The third *sutra* in the above gives an additional reason for rejecting the Ekashtaka; while in the fourth *sutra* *vichhinnam* is substituted for *vyastam* of the Taittiriya Samhita. Another important change is, that the word *Phalguni-purnā-masa* is paraphrased by *Phalguni* in the 8th *sutra*, thus

clearly showing that the former was then understood to mean the full-moon night. Both the passages are similar in other respects.

Fortunately for us Sayanacharya is not our only guide in the interpretation of these important passages. It is probably the only passage (the two passages being similar I treat them as one) in the Vedas where the commencement of the annual *satra* is given and from the ritualistic point of view it has formed the subject of a learned discussion amongst the Mimansakas. Jaimini in his *Mimansa-darshana* Chap. vi. Sect. 5 has devoted an *Adhikarana* (10th) to the interpretation of this passage, and the subject has been thoroughly discussed by Shabara, Kumarila, Parthasarathi, Khandadeva and other writers on *Mimansa*. We have thus a continuous tradition about the meaning of this passage current amongst the Indian divines—a tradition based not upon mere authority, but on the logically solid rules of exegesis propounded in the work of Jaimini. I shall first give a literal translation of the passage from the *Taittiriya-Sanhita* and then discuss its interpretation as bearing on the present question.

"Those who are about to consecrate themselves for the year (sacrifice) should do so on the *Ekashtaka* (day). The *Ekashtaka* is the wife of the year; and he [*i. e.*, the year] lives in her [*i. e.*, the *Ekashtaka*] for that night. (Therefore they) practically sacrifice (by) beginning the year.* Those

* The *Tandya Brahmana*, (*Sutra* 3 in the above passage) adds a third reason thus—"They go to *avabhritha* [*i. e.*, the final bath] not delighted with water." Shabara and other commentators on Jaimini have noticed this additional ground for rejecting the *Ekashtaka*.

that sacrifice on the Ekashtaka, sacrifice to the distressed (period) of the year. It is the season (*dual*) whose name comes last. Those, that sacrifice on the Ekashtaka, sacrifice to the reversed* (period) of the year. It is the season (*dual*) whose name comes last. They should consecrate themselves for the sacrifice on the Phalguni full moon. The Phalguni full-moon is the mouth of the year. They sacrifice (by) beginning the year from the very mouth. It has only one fault, viz., that the Vishuvan [*i. e.*, the equator or the central day] falls in the rains. They should consecrate themselves for the sacrifice on the Chitra full-moon. The Chitra full-moon is the mouth of the year. They sacrifice (by) beginning the year from the very mouth. It has no fault whatsoever. They should consecrate themselves for the sacrifice four days before the full-moon. Their *Kraya* [*i. e.*, the purchase of soma] falls on the Ekashtaka. Thereby they do not render the Ekashtaka void [*i. e.*, of no consequence]. Their *Sutya* [*i. e.*, the extraction of soma juice] falls in the first [*i. e.*, the bright] half (of the month). Their months [*i. e.*, the monthly sacrifices] fall in the first half. They rise [*i. e.*, finish their sacrifices] in the first half. On their rising, herbs and plants rise after them. After them rises the good fame that these sacrificers have prospered. Thereon all prosper."

Here in the beginning we are told that the Ekashtaka is the day to commence the *Satra*, which lasts for one year. But the word Ekashtaka is used to denote the eighth day of the latter (dark) half of the four months of Hemanta and Shishira seasons,† and sometimes it means the eighth day of the

* According to the Tandya Brahmana "broken" or "destroyed."

† Cf. *Ashv. Gri. Sutra* ii. 4, 1, हेमन्तशिशिरयोश्चतुर्णामपरपञ्चादम-
ष्टमीपञ्चकाः ।

dark half of each of the twelve months of the year.* The statement in the following sentences that this Ekashtaka is liable to the objection of occurring in the cold or the last season does, however, at once narrow the field of our choice. It must be further borne in mind that the Ekashtaka, here spoken of, is the wife of the year, and is contrasted with the Phalguni and Chitra full-moons; while tradition in the time of Jaimini and Apastamba interpreted it to mean the 8th day of the dark half of Magha. All writers on Mimamsa therefore take this Ekashtaka to mean the 8th day of the dark half of Magha. As the Ekashtaka is the wife of the year† and as the god of the year is said to reside with her on that night, those that commence their sacrifice on the Ekashtaka may practically be supposed to commence it at the beginning of the year which resides there. In other words the Ekashtaka is thus a constructive beginning of the year, and therefore the early sacrifice may be commenced on that day. But the passage now proceeds to point out the objections to the commencing of the sacrifice on the Ekashtaka day. The 8th day of Magha falls during the distressed period of the year, that is, according to Shabara and other commentators the period

* Cf. Tandyā Brahmana x. 3.11. *इत्येकशतकः इत्यथानाश्रयः* । Sayana in his commentary on Tan. Br. v. 9, observes that Ekashtaka is there used in its secondary sense and quotes Apastamba Grihya Sutra (viii. 21, 10) thus—*वा माघ्या पूर्णमास्या उपरिदिह चरका तस्यादनी ज्वेदवा संपद्यते । तनिकादिकेवाचक्षते* । Thus both Jaimini and Apastamba considered Ekashtaka to mean the 8th day of the dark half of Magha.

† Shabara on Jaimini vi. 5. 35, quotes Atharva Veda iii. 10. 2; and Sayana in his Comm. on Taitt. San. vii. 4. 8, cites Atharva Veda iii. 10. 12, and Taitt. San. iv. 3. 11. 3. But these texts simply state that the Ekashtaka is the wife of the year, without defining

when people are distressed by cold.* The word in the text is *arta* which literally means 'distressed', but Sayana takes it to denote the end or destruction of the year, implying thereby that the old year is then brought to an end and that the consecration for the yearly *sutra*, which must be made before the beginning of the new year, or, in other words, not after the previous year is ended or destroyed, cannot be made at this time. Though Shabara and Sayana thus give different interpretations of *arta*, practically both agree in holding that in those days the old year ended before the eighth day of the dark half of Magha; for Shabara distinctly states that the word "reversed" used further on means "reversed on account of the change of *ayana*."† Sacrificing during the distressed period of the year is thus the first objection to commencing the *sutra* on the Ekashtaka day. The second objection is that it is the last season, that is, though you *may* be said to sacrifice to the constructive *beginning* of the year, yet as far as the seasons are concerned you sacrifice in the *last* of them. The word for season, *ritu*, has been used in the text in the dual number and it might be urged that it denotes two seasons. A reference to the Taittiriya Sanhita iv. 4.11.1 will, however, show that the word *ritu* is there used* in dual, probably because each season comprises two months,† just as "scissors" is

* आर्ता यस्मिन्काले भवन्ति स आर्तः कालः, शीतेन च आर्ता भवन्ति ।
Shabara on Jaim. vi. 5. 37. Sayana आर्तमभिधिनाशमनिलक्ष्य वीक्षन्ते ।

† अयनपरिवृत्तिव्यस्तशब्देनोच्यते । Shabara on Jaimini vi. 5.37.
Sayana in his comm. on Taitt. San. says व्यस्तमभिधिपर्वोत्तमनिलक्ष्य वीक्षन्ते । आशौ हि वीक्षा कर्तव्या । अयं संवत्सरस्त्वातः कालः ।

‡ ननु च माधवश्च वास्तनिकावृत् । Upon this passage the author of Kala Madhava observes द्विवचनं ऋत्ववयवनासाभिप्रायम् (Cal. Ed., p. 59.

used in plural in English. A similar passage also occurs in the Vajasaneyi Samhita (19.25) and Mahidhara while commenting on it expressly states that the dual there has the meaning of the singular number.* The "last named seasons (*dual*)" therefore simply means "the last season." It must be here mentioned that according to the passage in the Tandya Brahmana, which Shabara appears to quote, the first objection is thus stated—"not delighted with water they go to *avabhṛitha* [*i. e.*, the final bath]." This is but an amplification of the objection on the ground of the "last season" and Khandadeva expressly says that water is then undelightful "on account of cold." The Tandya Brahmana does not omit the objection of the "last season;" but simply expands and illustrates the same by referring to the natural dislike for a cold bath in that season. We may, therefore, regard this objection more as explaining the first than as an additional one. We now come to the third objection, *viz.*, those that commence the sacrifice on the Ekashtaka day ~~sacrifice to the~~ reversed period of the year. 'Reversed,' *vyasta* in the original, is said by Shabara to indicate the change of *ayana* caused by the turning away of the sun from the winter solstice,† and Sayana seems to understand it in the same way. Thus although those that commence the *satra* on the 8th day of the dark half of Magha may be supposed to do so practically at the beginning of the year, the husband of the Ekashtaka, yet the procedure is triply objectionable, inasmuch as they sacrifice in the cold season, in the last of seasons (when water is undelightful) and when the year is reversed or upset by the turning away of the sun from the winter solstice.

* द्विसप्तमेकवचनार्थम् ।

† Quoted in the second note on the last page.

To get over this threefold objection an alternative is next proposed. The Phalguni full-moon day was known to be the first day of the year. If you commence your sacrifice on that day, you avoid the three objections previously noted and still secure your object of sacrificing at the beginning or the mouth of the year. But even this course is not faultless, because if you commence on the Phalguni full-moon the middle or the central day of the *satra* falls in the rainy season, which again is not a desirable time. The first twelve days of a *satra* are taken up in the consecration and twelve more in *upasads* after which the regular *satra* sacrifices commence. So the middle day of the *satra* falls after six months and twenty-four days from the Phalguni full-moon, that is, on the ninth of the bright half of the month of Ashvina.* Now if we suppose the winter solstice or the beginning of the cold season to fall on the Magha full-moon, the summer solstice, or the end of the summer and the beginning of the rainy season, would fall a little after the full-moon in Shravana. The months of Bhādrapada and Ashvina therefore represented the rainy season in those days, and the occurrence of the Vishuvan in Ashvina or the rainy season was not believed to be auspicious. As the next alternative it is, therefore, suggested that the consecration should take place on the Chitra full-moon, and this course is said to be open to no objection whatsoever.

But even this is given up for a still better time, and it is finally stated that persons desirous of consecrating themselves for the *satra* should do so "four days before the full moon." The full-moon here mentioned is not, however, specifically defined, and consequently it forms the subject

* This, in substance, is Sayana's explanation in his commentary on this passage.

of one of the Jaimini's Adhikaranas.* As no specific full-moon is mentioned it may mean either any full-moon-day, or the Chitra full-moon which is mentioned next before in the same passage, or it may refer to the Magha full-moon as the Ekashtaka is mentioned immediately afterwards in connection with it. Jaimini decides that it is the full-moon in the month of Magha, for it is stated immediately after that those who commence the sacrifice on this full-moon will purchase their Soma on the Ekashtaka. This Ekashtaka can evidently be no other than the one mentioned in the beginning of the passage, and the object of the arrangement last suggested is to utilise somehow or other the important day of the Ekashtaka, which was at first recommended for the commencement of the sacrifice itself, but which had to be given up on account of the three-fold objection stated above. The full-moon must, therefore be the one next preceding this Ekashtaka. Again the full-moon day is said to be such that when the sacrifice is finished the herbs and the plants spring up, which, as remarked by Shabara, can happen only in the Vasanta season.

To sum up; the last mentioned full-moon, though not specifically defined, must be prior to the Vasanta season

* Jaimini vi. 5, 30-37, Jaimini's Sūtras which I have here tried to translate and explain are as follow—1. पौर्णमास्यामिदमोऽविशेषात्; 2. आनन्तर्यातु चैवी स्यात्; 3. माघी वैकाटकाभ्युतेः; 4. अन्वाऽपि ति चे-
त्; 5. न भक्तिव्यवस्था हि लोके; 6. शिक्षापराधे चाजुमहात्; 7. उत्थाने चाजु-
रीहत्; 8. अस्वां च सर्वलिंगानि. Sayana in his Jaimini-nyaya-mala-
vistara and in his comm. on the Taitt. San. fully adopts this
view. But in his comm. on the Tandya Brahmana, v. 9. 12 (Cal.
Ed.) he is represented as saying that the full-moon last mentioned
refer to the Chaitri! Some one, either the scribe, printer, or the
publisher, has here obviously committed an error.

whole passage the intention of sacrificing at the beginning (real, constructive, or traditional) of the year is quite clear. The full-moon in Magha must, therefore, have been one of such beginnings. (2) That the year then commenced with the winter solstice. (3) That as there cannot be three real beginnings of the year at an interval of one month each, the passage must be understood as recording a tradition about the Chitra full-moon and the Phalguni full-moon being once considered as the first days of the year. (4) That *Vishuvan* had lost its primary meaning and that it fell in the rainy season if the sacrifice was commenced on the Phalguni full-moon.

The passage thus supplies not only confirmatory, but direct evidence of the coincidence of the Krittikas with the vernal equinox in the days of the Taittiriya Sanhita. For, if the winter solstice fell on the full-moon day in Magha, then the summer solstice, where moon must then be, must coincide with the asterism of Magha, and counting seven Nakshatras backwards we get the vernal equinox in the Krittikas. Independently of the Vedanga Jyotisha we thus have four different statements in the Taittiriya Sanhita and Brahmana clearly showing that the vernal equinox was then the Krittikas: *firstly*, the lists of the Nakshatras and their presiding deities, given in the Taittiriya Sanhita and Brahmana, all beginning with the Krittika; *secondly*, an express statement in the Taittiriya Brahmana that the Krittikas are the mouth of the Nakshatras; *thirdly*, a statement that the Krittikas are the first of the Deva Nakshatras, that is, as I have shown before, the Nakshatras in the northern hemisphere above the vernal equinox; and *fourthly*, the passage in the Taittiriya Sanhita above discussed, which expressly states that the winter solstice fell

in the month of Magha. The vernal equinox is referred to the Krittikas directly or indirectly in all these passages and I do not think that any more confirmatory evidence from the Vedic works is required to establish the proposition that the Krittikas coincided with the vernal equinox, when the Taittiriya Sanhita was compiled. As an additional proof I may, however, mention the fact, that Pitris are said to be the presiding deities of Magha in the Taittiriya Sanhita iv. 4. 10. 1. With the Krittikas in the vernal equinox Magha is at the summer solstice and as the Dakshinayana or the *ayana* of the Pitris commenced at this point, the asterism which happened to be there at that time was naturally assigned to the Pitris. The position of all the other cardinal points of the ecliptic can be thus shown to be consistent with the position of the vernal equinox in the Krittikas.

Supposing the Krittikas to denote the asterism of that name, this gives us, according to Prof. Whitney's* calculation, 2350 B. C. as the probable time for the compilation of the Taittiriya Sanhita. Some scholars unwilling to carry the antiquity of the work to such a remote period, have urged, without assigning any special reason, that by Krittikas we must here understand the beginning of the zodiacal portion of that name. Now as the position of the asterism of the Krittikas in its zodiacal portion is $10^{\circ} 50'$ from the beginning,† these scholars would place the vernal equinox about 11° behind the asterism of the Krittikas and thus reduce the antiquity of the Sanhita nearly by $11 \times 72 = 792$

* See *Surya Siddhanta* Add. notes, p. 323.

† This is the position given in the *Surya Siddhanta* viii. 2-9. See the table prepared by Prof. Whitney in his notes to this passage.

years or to about 1426 B. C.* I have briefly stated before my reasons for discarding this supposition and holding that the names of the Nakshatras in the early Vedic days must be taken to denote the asterisms known by such names. If Indian priests are to be supposed incapable of making any accurate observations of solstitial points in 1200 B. C.,† it is to my mind utterly inconsistent and illogical to hold that the forefathers of these priests, when they assigned the vernal equinox to the Krittikas, understood the word to mean not the asterism but the imaginary beginning of the zodiacal portion of that name. I cannot also understand why scholars should hesitate to assign the Vedic works to the same period of antiquity which they allow to the Chinese and the Egyptians‡. But it is needless here to enter into this controversy. For if I once succeed in showing, as I hope to do, that there is sufficient internal evidence in the Vedic literature itself of a still remoter antiquity, all theories, conjectures, and guesses, which have the effect of unduly reducing the antiquity of the Vedic works and also of throwing discredit upon the claims of the Indians to the origin of the Nakshatra system, will require no refutation.

Bentley, however, takes his stand on a different ground.

* This is Bentley's date about which see *infra*.

† See Pref. to Rig., vol IV., p. xxix.

‡ M. Biot allows it in the case of the Chinese and considers that the Hindus borrowed the Nakshatra system from them. Albiruni, in his chronology of ancient nations, &c., observes that other nations begin their asterisms with the Pleiades. He further states that he has found in some books of Hermès that the vernal equinox coincides with the rising of the Pleiades, but, says he, "God knows best what they intend!"

He suggests that the word *Vishakha*, like *Vidula*,* may mean "possessed of two branches," and that these two branches may have been caused by the equinoctial colure bisecting the zodiacal portion of the Vishakhas. Now the equinoctial colure passing through the beginning of the divisional Krittikas naturally bisects the zodiacal portion of Vishakha. Bentley, therefore, concludes, without any more proof than this etymological conjecture, that this was the position of the colure when Vishakha received its name. This is no doubt an ingenious hypothesis. But there is not only no evidence in the Vedic works to support such etymological speculation, but it may be easily shown to be inconsistent with the position of the winter solstice in the days of the Taittiriya Sanhita.

I have already stated that from the passage of the Taittiriya Sanhita just quoted we may fairly infer that the winter solstice occurred in those days on the full moon in Magha. According to the Vedanga Jyotisha it fell a fortnight earlier, that is, on the first day of the bright half of Magha. It is roughly estimated that the equinox must recede about two divisional Nakshatras, i. e., $27^{\circ} 40'$, to make the seasons fall back by one month. Between the times of the Taittiriya Sanhita and the Vedanga Jyotisha the equinox must accordingly recede $13^{\circ} 20'$ or nearly 14° . Now the position of the equinox as given in the Vedanga Jyotisha is 10° of Bharani. From this to the beginning of the divisional Krittikas, the distance is only $3^{\circ} 20'$, while if we measure it from the *asterism* of Krittika it is $3^{\circ} 20' + 10^{\circ} 50' = 14^{\circ} 10'$. Therefore during the period that lapsed between the

* This example has been added by Prof. Max Muller. See Pref. to Rig., Vol. IV., p. xxx. See also Bentley's *Historical view of Hindu Astronomy*, p. 2.

Taittiriya Sanhita and the Vedanga Jyotisha the equinox, according to Bentley, receded only $3^{\circ} 20'$; while if we understand the Krittikas to denote the asterism of that name, it gives us a precession of $14^{\circ} 10'$. Now as the winter solstice fell a fortnight later in the days of the Sanhita we must accept the latter precession of 14° , which alone corresponds with that interval of time (i. e., a fortnight) and assume that the vernal equinox then coincided with the asterism of Krittika, a conclusion the probability of which has already been established on other grounds. Bentley's speculation must, therefore, be rejected, unless we are prepared to allow his guess about the primary meaning of Vishakha to prevail against reasonable conclusions based upon a passage from the Taittiriya Sanhita.

But even admitting Bentley's speculation about the meaning of Vishakha, we may fairly question the soundness of the conclusion drawn therefrom. For what ground is there for holding that the two divisions of Vishakha must be mathematically *equal* in every respect? The word *dala* in *vidala* may be so understood; but *dala* and *shakha* are not similar in this respect. Bentley's error, therefore, consists not in supposing that the colure may have cut the divisional Vishakhas, but in inferring therefrom that it must have bisected it. The whole ecliptic was divided into 27 Nakshatras, and $13\frac{1}{2}$ could only be comprised in each hemisphere. Vishakha, the 14th Nakshatra from the Krittikas, may have been thus considered, by simply counting the number of the Nakshatras, as lying partly in the region of the Devas and partly in that of the Pitris.*

* This is enough to satisfy a merely etymological speculation unsupported by any other evidence whatsoever. Speaking more

For though we might hold that the Vedic observers were not provided with means to fix imaginary points in the heavens and to refer to these points the motions of the heavenly bodies as astronomers do at present, yet it does not imply that they were unaware of the approximate distances between the various asterisms selected by them. In other words, they might be supposed to have roughly known the distances between the stars, though for obvious reasons they could not but refer the motions of the heavenly bodies only to the fixed stars. Thus understood, Bentley's conjecture about the the primary meaning of Vishakhas does not necessarily imply that the equinotical colure bisected the divisional Vishakhas in those days; and when the conjecture itself does not thus support his theory about the position of the colure, I do not think we shall be justified in accepting it, especially when it is shown that it is also objectionable on other grounds. I am, therefore, disposed to fix the date of the Taittiriya Sanhita at 2350 B. C., and not 1426 B. C. as Bentley has done.

accurately if the vernal equinox coincided with the asterism of the Krittikas, the equinotical colure falls out of the divisional Vishakhas by 4° , but it is nearly 6° behind the asterism of Anuradha. Of these two asterisms Vishakha would therefore be nearer to the colure. But we might as well ask what ground there is for holding that the Nakshatra divisions of the Zodiac, at the time when the vernal equinox was in the Krittikas (supposing such divisions to have then existed), were the same as those which we now use and which commence with Revati. Bentley appears to have altogether overlooked this objection. I have already stated my view regarding the existence of the divisional Nakshatras in old times, and I would reject Bentley's etymological speculation on the mere ground that it requires us to assume the existence of such divisional Nakshatras and their bisection by colures.

So far, we have been going over the ground more or less traversed before by several scholars. But it may be asked if we have here reached the *Ultima Thule* of the Vedic antiquity. Does the oldest hymn, the first utterance of the Aryan mind, reach back thus far and no further? Was it such a hymn that the Brahnavadins of old and Panini several centuries before Christ believed and declared as "seen"?

In what follows, I propose to bring together such evidence from the Vedic works as would enable us to deal with these questions. I have already drawn attention to the fact that the Chitra and the Phalguni full-moon are mentioned as the mouths or the beginnings of the year in the passage from the Taittiriya Sanhita last quoted and discussed. In the next chapter I shall endeavour to show how these statements are to be interpreted, how far they are corroborated by other evidence, and what conclusions we may deduce therefrom.

CHAPTER IV.

Agrahayana.

Phalguni full-moon, the new year's night—Sayana's explanation unsatisfactory—Phalguna could not be a Vasanta month—Two-fold character of the seasons, lunar and solar, superfluous.—Discussion of a passage in Sushruta—Bhaskara Bhatta's explanation—Winter solstice on the full-moon in Phalguna—The position of other cardinal points—Vernal equinox in Mrigashiras—*Agrahayani*—Native Lexicographers' explanation of the word—Grammatically objectionable—Its real meaning according to Panini—Erroneous rank of Margashirsha amongst months according to the Bhagavad Gita and Amara—Margashirsha could not have been the first month of the solstitial or equinoctial year—It leads to the libration of the equinoxes—Possible reason of the libration theory—Mrigashiras = *Agrahayana* or the first Nakshatra in the year—Mula, its primary meaning—Evidence of the summer solstice occurring in Bhadrapada—Origin of the annual feasts to the manes amongst Hindus and Parsis—Comparison of the primitive Hindu and Parsi calendar—Summary of results.

THE passage from the Taittiriya Sanhita quoted in the last chapter states that the Chitra and Phalguni full-moons were the beginnings of the year, which then commenced with the winter solstice in the month of Magha. The words used in the original are *Chitra-purna-masa* and *Phalguni-purna-masa* and these must be understood to denote, not the Chaitra and the Phalguna months, whether sidereal and synodical, as Prof. Weber seems to have, in one case, supposed, but the full-moon *days* in each of these months. This is evident from the fact that these have been recommended as alternative times for the commencement of the *satra* in opposition to the Ekashtaka day. In the case of the *Phalguni-purna-masa* we are further told that Visuvair counted from that time falls during the rainy season, and it

in impossible to suppose that Vishuvan can be counted from a month. The whole context, therefore, shows that it is a discussion as to the particular day best suited to commence the yearly sacrifice, and that *Chitra-purna-masa* and *Phalguni-purna-masa* must mean the days when the moon is full near the asterisms of Chitra and Phalguni. In the Tandya Brahmana* *Phalguni-purna-masu* is rendered by *Phalguni* and Jaimini has paraphrased *Chitra-purna-masa* by *Chaitri* and *Phalguni* and *Chaitri*, according to Panini (iv. 2. 3), are the names of days. These interpretations have been accepted by all the Mimansakas including Sayana, and we may do the same especially as there are several passages in the Taittiriya Sanhita where *purna-masa* is used in a similar sense.†

But why should the Chitra and the Phalguni full-moon be called the beginnings of the year? Sayana thinks that they were so described because they occurred during Vasanta or the first of the seasons.‡ But the explanation does not appear satisfactory. I have previously shown that according to all astronomical works Shishira commenced with the winter solstice, and that the three seasons of Shishira, Vasanta and Grishma were comprised in the Uttarayana as it was then understood. Now in the day of the Taitti-

* See the passages quoted in the last chapter.

† In Taitt. San. ii. 2. 10. 1. we find तिष्यापूर्णमास similarly used. In i. 5. 10. 3. दशपूर्णमासौ are mentioned together; while in ii. 5. 4. 1. पूर्णमास and अनावस्या are contrasted.

‡ In his commentary on Taitt. San. vii. 4. 8. speaking of फल्गुनीपूर्णमास Sayana observes तस्य च भाविसंवत्सरोपक्रमविनश्चान् । एतदेवाभिधेत्वाधानब्राह्मणे समाम्नातं । उत्तरयोरादधीत । एषा वै प्रथमा रात्रिः संवत्सरस्य बहुसरे फल्गुनीति ।; while of चित्रापूर्णमास he says—सोऽपि ।पातित्वास्तवत्सरस्य शुक्लमेव ।

riya Sānhita the winter solstice, as shown in the last chapter, fell in the month of Magha; and Magha and Phalguna were therefore comprised in Shishira, and Chaitra and Vaishakha in Vasanta. But in order that Sayana's explanation might be correct Phalguna must fall in the Vasanta season which as a matter of fact, it did not. In his commentary on the Baudhayana Sūtras* and also in the Kālamādhava† Sayana tries to get over this difficulty by proposing a double Vasanta—lunar and solar, the lunar to include the months of Phalguna and Chaitra, and the solar those of Chaitra and Vaishakha, quoting amongst others, Rig. x. 85. 18, as an authority to show that the seasons were regulated by the moon. The authorities, however, are not explicit and therefore sufficient to maintain the two-fold character of the seasons; nor do I see the necessity of the two-fold character. It is true that the months in the calendar were all lunar, but the concurrence of the lunar and the solar year was always secured by inserting an intercalary month whenever necessary. Under such a system lunar seasons can have no permanent place. Now and then lunar months ceased, as they now do, to correspond with the seasons they represented, but this was at once set aright by the introduction of an intercalary month. If we therefore,

*The passage is quoted in *India: what it can teach us* ? p. 323. Sayana there quotes Taitt. San. vii. 4. 8., and after noticing that the Chitra and the Phalguni full-moon are both said to begin the year, he observes—अथवा फाल्गुनश्चैवो वसंतः सुखं वा यत्तत्संवत्सरस्य यत्फाल्गुनीपूर्वमास इति श्रुतेः । एवं च सौरचान्द्रनेर्द्विर्ज वसंतद्वयमुपसंगृहीतं भवति । The theory of the two-fold seasons thus appears to have been started simply to reconcile the two statements about the Chitra and Phalguni full-moons.

† See Cal. Ed., pp. 60, 61.

exclude the correction due to the precession of the equinoxes, which was too minute to be noticed till after hundreds of years, there was thus no reason why the lunar seasons should come to be regarded as a permanent institution. But even accepting Sayana's two-fold character of the seasons it can be easily shown that it does not support his conclusions. A lunar year is shorter than a solar year by 11 days. If the solar Vasanta, therefore, commences on the 1st day of the lunar Chaitra month this year, it will commence on the 12th day of Chaitra (lunar) next year and 11 days later still in the third year when by the introduction of an intercalary month the commencement of Vasanta will be again brought back to the 1st day of Chaitra. The two-fold character of the seasons may thus delay the beginning of Vasanta to Vaishaka (lunar), but the season cannot be accelerated and brought back to Phalgunā. It is true that in the days of Sayana (14th century) Vasanta commenced, as it does now, in the month of Phalgunā; but it was so because the winter solstice had receded by over full one month by that time. Sayana does not appear to have fully realised the reason of this change and combining the occurrence of Vasanta in Phalgunā in his time with the occurrence of the same season of Chaitra in the day of the Taittiriya Sanhita and other works, he attempted to reconcile the difference on the theory of the two-fold character of the seasons. But we can now better understand the change as due to the precession of the equinoxes, and must, in consequence, reject Sayana's explanation as unsatisfactory.

The only other authority I can find for supposing that Phalgunā was a Vasanta month is the statement in Suśruta's medical work, that "Phalgunā and Chaitra make Vasanta." But on a closer examination of the passage

wherein this sentence occurs, it will be found to bear on its face the marks of later insertion. There are two consecutive paragraphs in Sushruta, each enumerating and describing the seasons of the year. The first states that "There the twelve months, beginning with Magha, make six seasons, comprising two months each. They are Shishira, &c., . . . Of these Tapa and Tapasya make Shishira and so on until all the six seasons in their usual order, the *ayanas*, the year and the lustrum are described; and at the end we have "this is called the wheel of time by some."* The second paragraph then begins with the words "But here" and continues to state "But here the six seasons are Varsha, Sharad, Hemanta, Vasanta, Grishma and Pravrisht," thus altogether dropping Shishira and dividing the rainy period into two seasons Varsha and Pravrisht. The paragraph then proceeds to assign the months to the seasons as follows—"Bhadrapada and Ashvina is Varsha, Kartika and Margashirsha is Sharad, Pausa and Magha is Hemanta, and Phalguna and Chaitra is Vasanta," and so on until all the months are assigned to their respective seasons. The second paragraph, however, makes no mention of the *ayanas*, the year, or the lustrum. It is therefore evident

*See *Sushruta*, Sutrasthana Adhyaya 6. The two consecutive paragraphs here referred to are—

तत्र माघादयो द्वादश मासा हिमासिकमुहं कृत्वा षड् ऋतवो भवन्ति । ते ऋतवः शिवरवस्तमीन्द्रवर्षाश्चरद्देवंताः । तेषां तपस्वपस्वौ प्रिथिवी । अथ हिमे भवतः । इति षड् ऋतवः । तयोर्दक्षिणं वर्षाश्चरद्देवंताः स एव निमेषः विष्णुपर्वतः कालश्चक्रवर्त्तिर्तमानः कालश्चक्रवर्त्तिर्तमानः इत्येव ।

इह तु वर्षाश्चरद्देवंताः तमीन्द्रवर्षाः षड् ऋतवो भवन्ति त्रि माघपक्षयोः हिमासिकेन व्याख्याताः । तद्यथा । भाद्रपदाश्वज्यौ । वर्षाः कार्तिकमार्गशीर्षौ ऋतवः । मेषमाघौ हेमन्तः । फाल्गुनश्चैत्रौ वसन्तः । वैशाखज्येष्ठौ ग्रीष्मः भाषाद-
आषाढौ प्रावृत्तिः ।

that the writer of the second paragraph, whosoever he may be, wished to note that the seasons and their corresponding months mentioned in the first paragraph had ceased to represent the actual state of things in the writer's time and province, and not thinking it desirable or possible to expunge or correct the old paragraph, he added immediately after it a second paragraph describing the seasons as he saw them. The words "*but here*" at its beginning, the assignment of four months to the rainy season, but under two different names of Pravarish and Varsha, to keep up the old number of the seasons, and the absence of any reference to the *ayanas*, the year and the lustrum described in the previous paragraph—all point to the conclusion that the second paragraph is of later origin and inserted with a view only to note the changes in the occurrence of events described in the paragraph next preceding it. It might be contended that the second paragraph is that of Sushruta, who notices the old order of things in the first. But I need not go into that question here. For in either case it is plain that the passage wherein Phalguna and Chaitra are assigned to Vasanta is the production of a later writer, whosoever he may be, whether Sushruta or any one else, and as far as our present inquiry is concerned we cannot take the passage as an authority for holding that Phalguna was a Vasanta month in the days of the Taittiriya Sanhita. I may however remark, that Vagbhata who professes to summarise the works of Sushruta and Charaka gives the order and description of seasons as we find it in the first paragraph in Sushruta,* without alluding to the changes noted in the second paragraph. We may, therefore, suppose that either

* *Aṣṭaṅgahridaya Sutrasthana iii. 1.* "नक्षत्रैर्विचक्रवर्षायादीः
कनाक्षरं कृतवत् स्मृताः । विधिराज्य... ।"

the paragraph did not exist in Vagbhata's time or that he did not regard it as genuine.

There is thus no reliable authority, that I am aware of, for holding that Phālguna, in the days of the Taittiriya Sanhitā, was a Vasanta month, and Sāyana's explanation does not in consequence hold good at least in this case. The explanation is further inconsistent with the fact that in several Brāhmanas and Sūtras the full-moon night in the month of Phālguna has been pronounced to be the *first night* of the year. The Shatapatha Brāhmaṇa (vi. 2. 2. 18) says "the Phālguni full-moon is the first night of the year." The Taittiriya (i. 1. 2. 8) and the Sāṅkhyāyana (iv. 4 and v. 1)* Brāhmanas contain similar passages, while the Gopatha Brāhmaṇa (i. 19) after stating that the Uttarā and the Purvā Phālguni are respectively the beginning and the end of the year, adds "just as the two ends of a thing meet so these two termini of the year meet together."† I have already quoted a passage from the Tāndya Brāhmaṇa to the same effect. The Sūtra-writers, though not so explicit, do however distinctly state that the annual sacrifices "should be commenced either on the Chaitri or the Phālguni full-moon night,"‡ thus clearly indicating that these were regarded as the beginnings of the year. If

* एषा ह संवत्सरस्य प्रथमा रात्रिर्वैष्णव्याः शत. Br. vi. 2. 18. एषा वै प्रथमा रात्रिः संवत्सरस्य बहुसरे कल्मुनी । शुक्ल एव संवत्सरस्य प्रथमा रात्रिः कल्मुनी । Taitt. Br. i. 1. 2. 8, शुक्ल वा एतत्संवत्सरस्य कल्मुनी पौर्णमासी । San. Br. iv. 4.

† शुक्लपुनरे कल्मुन्यो दुष्कं पूर्वं । तद्यथाप्रवृत्तत्वात् सनेतो स्वातां । एवमेतत्संवत्सरत्वात् सनेतो भवतः ।

‡ तेषां (scil. सांवत्सरिकानां) कल्मुन्यां पौर्णमास्यां चैष्वां वा प्रयोगः । Ashvalāyana Shr. Su. i. 2.14. 3; Kat. Shr. Su. v. 1. 1; San. Shr. Su. iii. 8. 1., xiii. 18. 3.

these passages mean anything, we must hold that the Phālguni full-moon night was once considered to be actually the first night of the year, or to put it in a modern form the new year's night. We cannot assign this position to it by simply assuming, as Sayana has done, that the night occurred *sometime* during the two months of Vasanta. Sayana it appears was aware of this objection and so in commenting on the passage from the Taittiriya Sanhita, quoted in the last chapter, he attempts to explain the position of the Phālguni night by reference to the above mentioned passages in the Brāhmanas, while with respect to the Chaitri, he quietly observes that "this *too* is the mouth of the year as it falls during the season of Vasanta."* But an explanation that admittedly fails in one case must fail in the other, for the Chitrā and the Phālguni nights are described together, in the *same* passage and in the *same* words, as the beginnings of the year.

It will be clear from the above, *first*, that the theory of the lunar seasons, started by Sayana to account for the position assigned to the Phālguni night in the Vedic works; cannot have a permanent place in the Vedic calendar; *secondly*, even accepting the theory, the beginning of the solar Vasanta might be put off to the month of (lunar) Vaishākha, but could not be brought back to any day in Phālguna; and *thirdly*, the express texts in the Brāhmanas declaring the Phālguni full-moon to be the new-year's night are inconsistent with Sayana's explanation. We must therefore look for some other solution.

But if Sayana's explanation cannot be accepted, at least

* See the original remark quoted *supra*. The word "*too*" in this explanation implies that it holds good also in the case of the Phālguni full-moon.

with respect to the Phalguni night, how are we to interpret the several passages in the Sanhita and the Brahmanas given above? We cannot suppose that the Phalguni full-moon commenced the year at the vernal equinox; for then we shall have to place the vernal equinox in Uttara Bhadrpadā, which to render possible in the pre-Krittika period we must go back to something like 20,000 B. C. The only other alternative is to make the full-moon commence the year, at the winter solstice, and from the fact that the Maghi, the Phalguni and the Chaitri full-moons are mentioned together in the *same* passage of the Taittiriya Sanhita, and for the *same* purpose, I conclude that this is the real meaning of the passage in the Taittiriya Sanhita and those in the Brahmanas. It is the most natural and reasonable interpretation of the passage and I find that Bhaskara Bhatta, who is older than Sayana, fully adopts this view in his Bhashya on the Taittiriya Sanhita.* I have

* A MS. of Bhaskara Bhatta's Bhashya on the Taittiriya Sanhita has been recently discovered at Mysore and through the kindness of Sir Sheshadri Iyar, the Dewan of Mysore, I have been able to procure a copy of the Bhashya on the passage here discussed. Bhaskara Bhatta after commenting on the first part of the passage which states that the sacrifice should be commenced on the Ekashtaka day, makes the following observation as regards the alternative next proposed—एवं दूषयित्वा पक्षांतरं परिगृह्णाति । कल्पुनीपूर्वमास इत्यादि । कल्पुन्या युक्तः पूर्णमासः कल्पुनीपूर्वमासः । मुखं वा इति । अत्र केचिदाहुः काल्पुनारिः संवत्सर इति । तन्मते मुखस एव संवत्सरं परिगृह्य इति कृता भवति । As regards the third alternative proposed in the text, viz. the Chitra full-moon, Bhaskara Bhatta observes further on—अतः पक्षांतरं परिगृह्णाति । चित्रापूर्वमास इत्यादिवत् । चैत्रारिः संवत्सर इति चेत्तं नतं सत्य इदानीमुच्यते । Finally Bhaskara Bhatta follows Jaimini and Shabara in the interpretation of the last part of the passage and concludes by observing that the best time for the sacrifice is 4 days previous to the full-moon in Magha.

however devoted so much space to the discussion of Sayana's explanation as the high authority of that scholar is likely to mislead us in the interpretation of the passage. The Bhāṣya of Bhaskara Bhatta fully shews that Sayana is not here following any older tradition and the reasons given by him for explaining the position assigned to the Phalguni full-moon in the Vedic works are mere conjectures and guesses of his own. I admit that even the guesses of a scholar like Sayana deserve consideration. But when on a closer examination we find that they are not supported by any old traditions and are besides objectionable on various other grounds, I think we are bound to reject them. (As observed by Bhaskara Bhatta, the passage in the Taittiriya Saṁhita must, therefore, be understood as referring to an older year beginning, and we must hold that the full-moon in Phalguṇa did as a matter of fact once commence the year at the winter solstice. I know that this view has been regarded as improbable by some scholars, on the sole ground that it would, if substantiated, enhance the antiquity of Vedic works by about 1000 years more than what these scholars are willing to assign to them; and as the natural result of such prepossessions amongst them the subject has till now remained uninvestigated. But I hope that they will patiently examine the evidence, direct and corroborative, which I intend to put forth in support of the suggestion and then give their judgment upon it. There is no *a priori* impossibility involved in the hypothesis that the old priests, after changing their starting-point to the Kṛittikas and framing the calendar accordingly, continued to recognize for sacrificial purposes, the older positions of the Nakshatras, just as all Brahmans from the Himalaya to the Cape Comorin at present perform their sacrifices on days and at times fixed when the vernal equinox

was in the Krittikas. I think the present Brahmans are worse off in this respect, inasmuch as they have not even the liberty, which the passage in the Taittiriya Sanhita accorded, though hesitatingly, to the old priests, of choosing either the old or the new calendar. To use the words of Professor Max Muller we must in such cases, therefore, "keep our preconceived notions of what people call primitive humanity in abeyance for a time,"* and form our judgment of antiquity, as we do of other facts, solely upon evidence.

We have seen in the last chapter that the evidence for placing the vernal equinox in the Krittikas consisted of (1) the lists of the Nakshatras all beginning with the Krittikas, (2) the winter solstice then falling in the month of Magha, (3) the Nakshatra at the summer solstice being presided over by the *pitris*, and (4) the possibility of considering, as Bentley suggested, the portion of the Nakshatra at the autumnal equinox as divided by the equinoctial colure. In short, if the year was supposed to have begun in the month Magha, the position of the four cardinal points of the ecliptic as referred to the Nakshatras, was consistent with, and so indirectly established the truth of, such a supposition. Let us see if we can produce similar evidence for establishing the hypothesis (for it is no better at present) that the year in the old Vedic days began, as stated in the Brahmanas, with the Phalguni full moon, and that the winter solstice occurred on that day. On a rough calculation the vernal equinox, must recede two divisional Nakshatras to make the seasons fall back by one month. If the winter solstice, therefore, occurred in the month of Phalguna, one month in advance of Magha, in the old Vedic days, the vernal equinox must then have been in Mrigashiras or two Nak-

* *India: what it can teach us* / p. 112.

shatras in advance of the Krittikas. Taking the data given in the Vedanga Jyotisha as his basis, the late Krishna Shastri Godbole has thus calculated* the position of the four cardinal points of the ecliptic, when the winter solstice as stated in the Brahmanas, occurred on the full-moon day in the month of Phalgun—

- (1) The winter solstice in $3^{\circ} 20'$ of the divisional Uttara Bhadrapada;
 - (2) The vernal equinox in the beginning of Ardra;
 - (3) The summer solstice in 10° of Uttara Phalguni; and
 - (4) The autumnal equinox in the middle of Mula;
- or giving up the system of reckoning by the divisional portions of the Zodiac, we have, roughly speaking; the winter solstice quite near the asterism of Uttara Bhadrapada, the vernal equinox between the head and the right shoulder of Orion or about 3° east of Mrigashiras, the summer solstice at a distance of within 2° east of Uttara Phalguni, and the autumnal equinox about 5° east of the asterism of Mula. If we suppose the vernal equinox to coincide with Mrigashiras, the three other cardinal points are brought nearer to the fixed asterisms, and this appears to be the more probable position of the equinoxes and the solstices in those days. But without entering into these details, it will be evident from this that when the winter solstice fell on the Phalguni full-moon the vernal equinox must be very near the asterism of Mrigashiras or two Nakshatras in advance of the Krittikas. We have now to see what evidence there is in the Vedic works from which this old position of the four principal points in the ecliptic may be established. There appears to be no express passage in the Vedic

* See his essay on the *Antiquity of the Vedas*, p. 19.

works, which states that Mrigashiras, like the *Kṛttikā*, was over the mouth of the *Nakshatras*. But what is so lost may still be discovered, in the words of Prof. Max Muller, "hidden in the secret drawers of language." Mrigashiras may not be specifically described as the first of the *Nakshatras*; but the word *Agrahayani* which Amarasinha (i.3.23), gives as a synonym for Mrigashiras, and which supplies according to Panini, a derivative word for the month of Margashirsha tells the same tale. *Agrahayani* literally means "commencing the year;" and the question is how did the *Nakshatra* come to be so called? In explaining the formation of this word all native lexicologists, begin by assuming that the full-moon in the month of Margashirsha was the first night of the year, hence called *Agrahayani*, and as this full-moon occurred in the month of Margashirsha the month itself was called *Agrahayanika*. There is no grammatical inconsistency so far. But when these lexicographers further tell us that the *Nakshatra* itself was called *Agrahayani* as Amarsinha has done, because the full-moon in the vicinity of that *Nakshatra* commenced the year in old days,* one feels that there is something wrong in this explanation. The ordinary course is to name the full-moon on any other day after the *Nakshatra*, as *Chaitri*, *Pausham*, *Paushi*, &c. (Pan.iv.2.3), while in the present case the order is reversed and the *Nakshatra*, we are told, is named after the full-moon. It is true that the lexicographers were, to a certain extent, compelled to adopt such a course, as they could not otherwise explain why *Agrahayani*, a term usually denoting a full-moon night, should have been given as a synonym for

* See Bhanu Dikshita's commentary on *Amar.* i. 3. 23. He explains the word thus—अग्रे स्रवणमन्त्रः । मार्गशीर्षमासः च वर्षप्रवृत्तिः । प्रवृत्तिश्च । पूर्वपक्षसिद्धिः च । आग्रहायणी पौर्णमासी । सद्योगाग्रहायणी स्रवणः ।

the Nakshatra of Mrigashiras by Amarasinha.^{*} But ever their motive, we have now to see if their explanations, as well as the statement in Amara, are correct. Turning to Panini we find no authority for this converse process. The word *Agrahayani* occurs in Panini iv. 2. 22, which lays down the rule that the derivative names of months are formed from *Agrahayani* and *Ashvattha*, by the addition of *thak*,* as a necessary termination; and this gives us the words *Agrahayanika* and *Ashvatthika* for the months of Margashirsha and Ashvina. Now in the previous *sutra* (iv. 2. 21) Panini states that the names of the months are derived from the names of the full-moon days that occur in those months. It appears, therefore, that he understood *Agrahayani* to mean the full-moon and not the Nakshatra of Mrigashiras. The word *Agrahayani* occurs thrice in Panini (iv. 2. 22; 3. 50: and v. 4. 110) and in all places it denotes the full-moon day. It is not, however, clear whether Panini treated it as a word derived in the same manner as *Chaitri*, &c. If we, however, rely on analogy there is every reason to hold that *Agrahayani*, like *Kartiki* and *Phalguni*, may have been derived from *Agrahayana* and that this may originally be the name of the Nakshatra of Mrigashiras. This supposition derives support from the fact that if, like Amarasinha, we take *Agrahayani* as synonymous with the Nakshatra of Mrigashiras and follow the native grammarians in deriving this name of the Nakshatra from that of the full-moon, it is very difficult to account for the initial long vowel in *Agrahayani*. All

* The *sutras* of Panini referred to in this discussion are अग्रहायण
 पूर्णमासी (iv. 2. 3), अग्रहायणवर्धमानसि संज्ञायां (iv. 2. 21), अग्र
 हायणवर्धमानसि (iv. 2. 22), चित्तिरसि-अथ (iv. 1. 41) and अग्रहायि-
 अथ (v. 4. 38).

lexicographers derive the word from *Agra* and *Hayana* combined in a Bahuvrihi compound and afterwards adding the feminine termination; thus *Agra* + *hayana* + *i*. But the feminine termination cannot be added without a previous suffix (*an*) which also gives the initial long vowel, as *i* is not a general feminine suffix, but is only used in special cases. We cannot get this *an* by Panini iv. 2. 3, as *Agrahayana* is not the name of a Nakshatra according to Amarasinha. Various suggestions have, therefore, been made to account for the initial long vowel. Bhattoji suggests that we should obtain the long vowel by including *Agrahayana* in the Prajnadi list (Pan. v. 4. 38); but in the Ganapatha, the list is not said to be a 'specimen list,'* nor is the word *Agrahayana* specifically included in the list there given. Boehtlingk and Roth in their dictionary obtain the long vowel by Pan. v. 4. 36; but here 36 may probably be a misprint for 38. Taranatha in his *Vachaspatya* obtains the long vowel by Panini v. 2. 102, Vartika 1; but Jyotsnadi is not again expressly said to be a 'specimen list.' Bhanu Dikshita, the son of Bhattoji, in his commentary on Amara† adopts his father's view and refutes that of Mukuta. The latter obtains the initial long vowel from the very fact that the word itself is so pronounced by Panini in iv. 2.22; but this gives us *Agrahayani* as a ready made word at once, and Mukuta had to assign some reason why the word should have been again included in the Gauradi list in Pan. iv. 1. 41. Mukuta's explanation is that Panini thereby intends to show that the feminine termination in *Agrahayani* is not dropped in compounds. But Bhanu

* अनुसिद्धः, meaning that the list is not exhaustive.

† See p. 62 of the Bombay Ed. of Bhanu Dikshita's com. on Amara.

Dikshita replies by observing that the Gauradi list was never intended for the purpose and that as regards the accent we can get it otherwise. Bhanu Dikshita's own explanation or that of his father Bhattoji also dispenses with the necessity of including the word in the Gauradi list as they obtain the feminine suffix *i* by Pan. iv. 1. 15; and so in replying to Mukuta he observes at the end that the "inclusion of the word in the Gauradi list is questionable." Thus if we suppose Amarasinha to be correct and accept either Bhattoji's or Mukuta's derivation of *Agrahayāni* we shall have to hold that the word in question was either wrongly included or subsequently inserted in the Gauradi list and that Panini, who knew the word, forgot to insert it in the Prajnadi or the Jyotsnadi list. Both the explanations are again open to the objection that in this instance the Nakshatra is named after the full-moon as against the usual method given by Panini in iv. 2. 3.

The whole of this difficulty, however, vanishes, if we give up the notion, that the full-moon night in the month of Margashirsha might have commenced the year at one time and that the name of the Nakshatra as given by Amara must be derived from the name of the full-moon. There is no express authority in the Vedic works to support such a theory and a closer examination of Panini's *sūtras* points to the same conclusion. Months in the Hindu calendar receive their names from the full-moon nights occurring in them; and the characteristics of a month are the same as those of the full-moon night after which it is named. If the full-moon night in Margashirsha was, therefore, ever the new-year's night then the month itself would have come to be properly called the first month of the year. In other words the month of Margashirsha would itself, in that case,

be called *Agrahayana*. Boehtlingk and Roth do interpret the word *Agrahayana* in this way on the authority of *Shabda-kalpa-druma* and Taranatha has done the same probably on the same authority, for none quotes any passage where the word is so used. Now if *Agrahayana* ever meant the month of Margashirsha, the word would also assume the form *Agrahayana* on the ground given above by Bhattoji,* and we shall have *Agrahayana* as another name of the month of Margashirsha. The word occurs in the Gauradi list (Pan. iv. 1. 41), and therefore must be taken to have been known to Panini. What did he understand it to mean? There is strong ground to hold that he could not have understood it to mean the month of Margashirsha. For if we suppose that in Panini's times there were two forms of the word in this sense—*Agrahayana* and *Agrahayanika*—he would have rather mentioned *Agrahayani* in iv. 2. 23,† along with *Chaitri*, &c. which gives the double forms *Chaitra* and *Chaitrika* and not with *Ashvattha* in iv. 2. 22† as he has now done. We may, therefore, infer that *Agrahayanika* was the only sanctioned form of the word to denote the month of Margashirsha in Panini's time. This means that Panini did not know of the theory which makes the year commence with the Margashirshi full-moon night or the month of Margashirsha (*Agrahayana*). If so, he could

* Bhanu Dikshita, in his commentary on *Amara* i. 4.14, gives *Agrahayana* as a synonym for Margashirsha on the authority of Purushottama and obtains the initial long vowel by including the word in the Jyotsnadi list.

† The *sūtras* are—अग्रहायणश्चतुर्मासः (iv. 2. 22) विभाषा कालुनीश्वरनामकसिद्धिचिन्ता (iv. 2. 23). As the *sūtras* follow each other it is natural to suppose that *Agrahayani*, if it gave rise to two forms, would have been included in the second *sūtra*.

not have derived the word *Agrahayani* for the full-moon night directly by taking it to be a Bahuvrihi compound.* The only other alternative is to derive it as we derive *Chaitri* and other similar words, and I think this is what Panini meant. For, if he had been aware of any such difficulty in the formation of *Agrahayani*,—a word thrice used by him,—and especially in obtaining the initial long vowel as Bhattoji and others have felt by taking it to be a Bahuvrihi compound, he would have naturally noticed it himself. I therefore conclude that Panini derived *Agrahayani* from *Agrahayana*, as the name of a Nakshatra. In this case we can derive *Agrahayani* in a simple and easy manner. For by Panini iv. 2. 3, we get the initial long vowel, when derivative words are formed from the names of the Nakshatras to express time; we now want the feminine suffix *i*, and though this could have been obtained by Pan. iv. 1. 15, yet, for accentual purposes, it may be considered as provided for by the inclusion of the word *Agrahayana*† in the Gauradilist in Pan. iv. 1. 41. We can thus derive the word in the ordinary way, and unless we have strong grounds to maintain that it was really the full-moon night and not the Nakshatra, which commenced the year, we shall not be justified in accepting unusual derivations and explanations of these words. It is true that the word *Agrahayana* as denoting a Nakshatra is now lost and Amarasinha only gives *Agrahayani* and not *Agrahayana* as

* For then the the full-moon night, and hence the month, would itself be the commencement of the year.

† Doubts have been raised as to the exact form of the word mentioned in the Gauradi list, and Bhanu Dikshita goes so far as to question whether the word was really included in the list by Panini.

a synonym for the Nakshatra of Mrigashirsa. But I shall presently show that Amarasinha is not alone in misconceiving the meaning of these old words. The theory that the Margashirshi full-moon was the first night of the year, has been the source of many other errors in later literature; but before examining these it was necessary to show how the theory has distorted the natural meaning and derivation of the very words on which it appears to have been based. As remarked above if there be any express or cogent authority to support the theory we might connive at the etymological difficulties, but if it be found that the theory is inconsistent with many other facts, or leads, as I shall presently show, to absurd results, the etymological distortions would afford us an additional ground for rejecting it.

We shall now examine in detail the theory that the full-moon night in Margashirsha was once the first night of the year. So far as I am aware, there is no express authority for such an hypothesis except the statement in the Bhagavad-Gita (x. 35) where Krishna tells Arjuna that he, Krishna, is "Margashirsha of the months (and), Vasanta of the seasons." Anandagiri in his gloss on Shankara's Bhashya upon the Gita, observes that Margashirsha is here specially selected because it is a month of plenty. But the reason does not appear to be either sufficient or satisfactory; for the next sentence, and in fact the whole context, shows that Margashirsha was here intended to be the first of the months. The principal commentators on the Gita are too philosophical to notice this point, but in a commentary written by Surya Pandit, an astronomer, entitled the *Paramartha-prape*, I find that he explains the statement on the ground that Margashirsha was otherwise called *Agrahayana*, and the latter word denotes that the full-

moon night in this month was the first night of the year.* If we accept this explanation, and no other plausible one is forthcoming, it appears that this statement in the Bhagavad-Gita was based on an etymological misconception of the meaning of the term *Agrahayānika*; and later writers like Amarasinha and Vagbhata,† simply followed the Gita in assigning the same position to the month of Margashirsha. We may, therefore, treat all these statements as coming from one source and representing a certain period of the Sanskrit literature, when native scholars first misconceived the primary meaning of *Agrahayānika*. I have already shown that, properly understood, the etymology of the word gives little room for such a misconception. *Agrahayānika* is really a derivative word and cannot therefore mean that the month denoted by it was the first in the year just as Jyeshtha does not mean the eldest month. But it appears that the tradition about Mrigashiras (*Agrahayana*) ever being the first of the Nakshatras, was completely lost in those days, and native scholars believed, on what they con-

* The commentary is printed at Poona. The words in the original are—ब्रह्मा मृगशिरः पूर्णिमासबंधेन वर्षाभिरभिहितस्तस्मिन्नेकमहावर्षीत्यानिर्धानात् । आर्षमाहायणं ब्रह्मां साममाहायणी । अत एवामहावर्षिक इति मार्गशीर्षिणाम् । अतीत्य मासस्य मुख्यत्वाद्भिन्निमस्वम् । If Anandagiri's explanation be correct then the Gita is not opposed to deriving *Agrahayani* from *Agrahayana*, the name of a Nakshatra, and the whole of the above discussion would be unnecessary.

† Vagbhata, in his larger work entitled *Ashtangasangraha*, otherwise called *Vridhdha Vagbhata* enumerates the months as beginning with Margashirsha. In i. 4 of the work the *Uttarayana* is said to commence with Magha, while Margashirsha is mentioned first amongst the months there enumerated, much after the same way as Amara has done in i. 4. 13 and 14.

sidered to be sound etymological grounds that the month and not the Nakshatra was the commencement of the year. Once started and embodied in the Gita, the theory gained an easy and rapid currency amongst native scholars, all of whom naturally felt bound to shape their views accordingly.

And not only literary scholars, but astronomers appear to have done the same. In old astronomical works the year commenced with the winter solstice and the first month of the year meant the first month of the Uttarayana which commenced with this solstice. If then the Margashirshi full-moon was said to be the first night of the year, an astronomer would naturally understand such statement to mean that the winter solstice fell on the full-moon day of Margashirsha. Now if we suppose that the Margashirshi full-moon was thus the night of the winter solstice, it would mean that the full moon on that day happened to be near the asterism of Mrigashiras. With the sun at the winter solstice, the moon, to be full, must be near the summer solstice; and therefore the summer solstice must have then coincided with the asterism of Mrigashiras. The vernal equinox is 90° behind the summer solstice; and if Mrigashiras coincided with the latter, the vernal equinox would then be 90° behind the asterism of Mrigashiras. This is the only logical and mathematical conclusion possible, if we accept the theory that the full-moon night in Margashirsha was the first night of the year at the winter solstice. And what does it mean? It means a clear mathematical absurdity to us, though older astronomers, not realizing its full effect, invented an explanation to account for it. The *Surya Siddhanta* (viii. 2-9) gives 68° as the polar longitude of Mrigashiras, counting from Revati. Now if the vernal equinox was 90° behind the asterism of Mrigashiras, it was

$90^{\circ} - 63^{\circ} = 27^{\circ}$ behind the asterism of Revati.* The Vedic works, on the other hand, mention the Kritikas as the first of the Nakshatras, and the winter solstice is shewn to have then occurred in the month of Magha. This means that the vernal equinox must be placed at least $26^{\circ} 40'$, or nearly 27° in front of Revati. Now imagine the position of the Indian astronomer, who could neither reject the statement in the Vedic works, nor the one in the Bhagavad Gita. Both were sacred and unquestionable texts, and it would be no wonder if, to his great relief, he got over the difficulty by proposing a libration of the equinoxes, 27° on either side of Revati! The hypothesis is now given up by modern astronomers as mathematically incorrect; but no reason has yet been assigned why it found place in the Hindu astronomy. A theory may be erroneous, but even an erroneous theory cannot become prevalent without a good cause. It has been suggested by Bentley and approved by Prof. Whitney†, that the limits of the libration might have been determined by the fact that the earliest recorded Hindu year had been made to begin when the sun entered the asterism of Kritika or $26^{\circ} 40'$ in front of Revati. But this alone is not enough to suggest the theory of libration. For, unless the Hindu astronomer had grounds—to him conclusive and

* This may imply that the Surya Siddhanta was in existence at the time when the libration theory was started. I think it was. But it has been suggested that the libration theory might have been subsequently inserted therein (See Whitney's *Sur. Sid.*, p. 104). It is not, however, necessary to make any supposition regarding the existence of the Surya Siddhanta at this time, as almost all other Siddhantas give the same *bhoga*, viz., 63° for Mrigashiras. See Colebrooke's *Essays*, Vol ii., p. 325 (table).

† See *Surya Siddhanta*, p. 103.

otherwise inexplicable—for holding that the vernal equinox fell 27° on each side of Revati, he would not have proposed the libration of the equinoxes. So far as I know no such grounds have been yet discovered by modern scholars, and if the explanation given above accounts for the theory in all its details, I see no reason why it should not be accepted as a probable explanation. Perhaps, it may be asked, what grounds I have to suppose that the astronomers combined the two statements declaring that Magha and Margashirsha were both, each in its turn, the first months of the year, and so obtained the theory of the libration of the equinoxes. This is, however, not the place to go fully into this discussion; for all that I am bound to prove, as far as the present inquiry is concerned, is that if we accept the theory that the Margashirsha full-moon was ever the new-year's night, it leads us to an absurd conclusion, and this is evident from the above whether it does or does not give the real explanation of the libration theory. I may, however, remark that when we actually find Amarasinha first stating (i. 4. 13) that "seasons comprise two months each beginning with Magha, and three such seasons make an *ayana*," and then in the very next verse enumerating the months commencing with Margashirsha; there is nothing extraordinary in the supposition that some Hindu astronomers might have similarly attempted to reconcile what were then regarded as the two beginnings of the year, by placing the statements in juxtaposition and pushing them to their logical conclusions. On the contrary, I should have been surprised if the Hindu astronomers had not done so.

But, apart from the origin of libration theory, I think it is clear that, if we accept that the Margashirsha full-moon was ever a new-year's night, in the sense that the winter

solstice occurred at that time, we are inevitably landed on an absurdity. By the ordinary process of *reductio ad absurdum*, we are thus compelled to abandon the theory that the full-moon in Margashirsha once began the year at the winter solstice. Native scholars and astronomers, who did not realize the absurdity, accepted the theory of the libration of the equinoxes as the only possible way of reconciling the two statements in their sacred books. We now know that the equinox cannot be placed 27° behind Revati, unless it be either in the beginning of the present cycle of the precession of the equinoxes or about 600 years hereafter, and we should have no difficulty in rejecting the premises that give us such a conclusion. Perhaps it may be urged that the full-moon night in Margashirsha might have been called the new-year's night in some other sense.* Yes, it

* The only other explanation, I know of, is that given by Bentley in his *Historical Survey of the Hindu Astronomy* pp. 5-27. Bentley divides the zodiac into 27 lunar mansions, beginning with Shnavishtha in the winter solstice, as in the *Vedanga Jyotisha*. Then he divides it again into 12 tropical months beginning with Magha. The beginning of Magha and the divisional Shnavishtha thus coincide at this time. Now the beginning of each month must fall back owing to the precession of the equinoxes; and in thus receding if the beginning of *any* month coincided with *any* fixed lunar mansion, on the 6th lunar day, the month, says Bentley, was made to commence the year! But what authority is there in native astronomical works for such an elaborate and artificial theory to determine the commencement of the year? Native astronomers are surely expected to know better the theory on which they commenced their year. Then, according to Bentley's calculations, Ashwina was the first month in 1192 B. C. and Kartika in 645 B. C. But there is no evidence whatsoever in the Sanskrit literature to corroborate these results. Again why should either of these months

might be; but what evidence is there that any native scholars ever thought of it? None that I know of. There are only two beginnings of the year known in ancient Hindu literature. I have shown that the winter solstice could not have occurred on the full-moon in Margashirsha, and by the same method we can prove the improbability of the vernal equinox falling on that day. For if we suppose the Margashirsha full-moon to be the new-year's night, in the sense that the vernal equinox occurred on that date, we must make the asterism of Abhijit coincide with the vernal equinox. This gives us about 20,000 years B. C. for the period when these positions could have been true. The author of the Bhagavata Purana appears to have had some such theory in his mind when he paraphrased (xi. 16. 27) the above quoted verse in the Gita by "I am Margashirsha of the months, Abhijit of the Nakshatras," and the late Krishna Shastri Godbole took this statement for a record of a real tradition! This illustrates the danger of relying on traditions in later books, without tracing them to their source in the oldest works we possess.

We must therefore rise above these etymological speculations of the native scholars of what Prof. Max Muller

not have been called *Agrahayana*? Bently supposes that this method was in force till 538 A. D.; if so, why should Pausa become *Agrahayana* instead of Margashirsha, in 451 B. C.? Bentley's *unsupported* speculation must, therefore, be rejected as imaginary. It gives no reason why Margashirsha, the third of the several months which, according to his theory, would successively begin the year from 1192 B. C. to 538 A. D., should alone have been called *Agrahayana*, and none whatever why the Nakshatra should be called *Agrahayani* contrary to the usual rule, according to which the word should denote the full-moon day.

the fact why Amarasinha lays particular stress on this point. For says he "Mrigashirsham (is) Mrigashiras; *Agrahayani* (is used) to denote *the very same**, thus implying that a feminine word is used to denote what he supposed might be regarded only in the neuter gender. This is, indeed, a plausible explanation. It not only absolves Amarasinha from the charge of having given a wrong, or at least a distorted, word, but makes him warn his readers not to misunderstand the word *Agrahayani* for the full-moon night—a mistake into which almost all his commentators have, however, unfortunately fallen. It may further explain why instead of the Nakshatra, the full-moon day (both of which were on this theory denoted by the same word *Agrahayani*) came to be regarded as the first night of the year and so gave rise to later speculations. But the fact that Amarasinha mentions Margashirsha first amongst the months shows that he was not altogether free from the influence of the speculative theory; and the explanation above stated must therefore be accepted with caution.

But whatever explanations we may adopt to defend Amara, I think it will be plain from the above that, so far as our purpose is concerned, we must reject the explanation of the commentators of Amara, who derive the name of the Nakshatra, as given by Amara, from *Agrahayani*, the name of the full-moon. After this we may either suppose *Agrahayana* or *Âgrahayani* or *Agrahayani* to be the name of the Nakshatra, for in every case the difference consists only in the *form* and *gender* and not in the *derivation*, or the meaning of the word. Thus understood *Agrahayani* or *Agrahayana* both give us the same meaning, viz., that *the year was in the front of the Nakshatra of Mrigashiras*; or in other

* Thus—मृगशीर्षे मृगशिरस्तस्मिन्नेवामहावर्षे । Why तस्मिन्नेव ?

words commenced with it. If what I have said above is enough to prove this, I do not care to insist on a particular form, whether masculine, feminine, or neuter, of *Agrahayana* which as an adjective is the basis of all such forms. With this reservation, I may, I think, in what follows use the word *Agrahayana* to denote the Nakshatra of Mrigashiras and as evidencing the circumstance that it was so called because it was the first Nakshatra in the year.

Corresponding to the winter solstice in Phalgun, we thus have the asterism of Mrigashiras of *Agrahayana* to commence the year from the vernal equinox, much after the same manner as the Kritikas were said to be the month of the Nakshastras when the winter solstice fell in the month of Magha. The express statement in the Brahmanas that the Phalguni full-moon commenced the year from, as I have previously shown, the winter solstice, is thus borne out by the tradition which we find treasured up in *Agrahayani*. Now if the vernal equinox was near the asterism of Mrigashiras the autumnal equinox would be in Mula. It has been ingeniously suggested by Bentley that this name signifying "root or origin" may have been given to the Nakshatra because it was once the first amongst the asterisms and he has actually given a list of the Nakshastras beginning with Mula; but he does not appear to have used it except to show that, when one of the twenty eight Nakshastras was dropped the divisional Jyeshtha and Mula both began from the same fixed point in the heavens,—a position which gives him the vernal equinox in the beginning of the Zodiacal portion of the Kritikas. I have already shown that we cannot suppose that the old Vedic priests made observations of imaginary lines in the heavens, and Bentley's explanation which entirely depends on the mathematical divisions of

the Zodiac is not therefore satisfactory. Nor can I accept Prof. Whitney's suggestion that Mula "may perhaps have been so named from its being considerably the lowest or farthest to the southward of the whole series of asterisms and hence capable of being looked upon as the root of all the asterisms."* I should rather suggest that Mula was so called because its acronycal rising marked the commencement of the year at the time when the vernal equinox was near Mrigashiras and the winter solstice fell on the Phalguni full-moon. *Agrahayana* setting with the sun in the west and Mula rising in the east then marked the beginning of the year, and this position of Mula is likely to be especially noted as the heliacal rising and setting of a star, and so of *Agrahayana*, is difficult to be accurately watched. The etymological meaning of Mula may thus be said to supply a sort of corroborative evidence for placing the vernal equinox in Mrigashiras though, in absence of other strong grounds, it is of no better value than a similar conjecture of Bentley about the name Vishakha, noticed in the last chapter.

I have already mentioned before that the year was divided into two *ayanas*, the northern and the southern, and that though originally the northern *ayana* indicated the passage of the sun to the north of the equator yet it afterwards came to indicate the passage of the sun from the winter to the summer solstice. I have also stated that after this change was made all the attributes of the older *ayanas* must have been gradually transferred to the new ones, though the old division was concurrently kept up; and that the new ideas were formed solely with reference to the solstitial division of the year. Thus the *Pitriyana* during

* See his *Surya Siddhanta*, p. 194.

which time the sun in older times went down the equator must have come to be regarded, for some purposes at least, as commencing from the summer solstice. With the winter solstice occurring on the Phalguni full-moon day, we shall have the summer solstice on the Bhādrapadi full-moon, so that the dark half of Bhādrapada was the first fortnight in the Pitriyana, understood as commencing on the summer solstice. It was thus pre-eminently the fortnight of the *pitris* or the manes; and to this day, every Hindu celebrates the feast to the manes in this fortnight. As far as I know no reason has yet been advanced why the dark half of Bhādrapada should be called the fortnight of the *pitris* (*pitri-pakṣa*) and why special feasts to the manes should be ordained at this particular period of the year. With the winter solstice in the asterism of Uttara Bhādrapāda, that is when it occurred on the Phalguni full-moon, the matter is simply and satisfactorily explained. For then the Dakṣinayana or summer solstice commenced on the dark half of Bhādrapada and this fortnight therefore naturally became the *first* fortnight in the *ayana* of the manes.*

And not only the Hindus but the Parsis celebrate their feast to the manes at the same time. The coincidence is

*This explanation implies that the feast to the manes became permanently fixed at this time; and there is nothing improbable in it. For as the Parsis hold similar feasts on corresponding days we must suppose that these feasts became fixed long before the Parsis and the Indians separated. When the vernal equinox receded to the Kṛittikas the feasts still continued to be celebrated in the dark half of Bhādrapada. But though the priests could not alter the days of these feasts, yet in assigning deities to the Nakṣatras they recognised the change by making *pitris* preside over Magha at the summer solstice.

important inasmuch as we are here dealing with periods of antiquity when the Indian, the Iranian, and the Hellenic Aryas must have lived together, and if our theory is correct it is sure to be corroborated by the customs, practices, and traditions of the other two sections of the Aryan race. I shall in the next two chapters show that there is ample independent evidence of this kind confirmatory of the theory that Mrigashiras commenced the equinoctial year in those early days. At present I shall only refer to the conclusions of Dr. Geiger as to the nature of what he calls the primitive or the oldest Avesta calendar. He takes *madhyaryo*—which literally means not 'mid-winter,' but 'mid-year'—as his basis and concludes that in the primitive Avesta calendar the year commenced with the summer solstice.* This is just what we should expect. The Indian Aryans commenced their year from the winter solstice or the beginning of the Uttarayana and the Iranians, who in such matters always took a diametrically opposite view, naturally commenced it with the summer solstice the beginning of the Dakshinayana, thus bringing the *Bruma* (or the winter solstice) in the middle of the year. But the coincidence does not stop here; and in the light of the old Indian calendar we are in a position to explain some difficult points in the primitive Avesta calendar. The Hindu *pitri-paksha* or the fortnight of the manes commenced with the summer solstice, while the Iranians celebrated their feasts to the manes just at the same time. The first month in their calendar was called *Fravashinam* or the month of the manes, and, according to the primitive calendar determined by

* See Dr. Geiger's *Civilization of the Eastern Iranians in Ancient Times*, translated by Darab Dastur Peshotan Sanjana Vol. I., p. 153.

Dr. Geiger, this first month, when the feasts to the manes were celebrated,* began with the summer solstice. Again the fourth month of the Avesta calendar was Tishtryahe or the month of Tistrya, which has been identified with the star Sirius. Counting with Bhādrapada in the summer solstice, the fourth month in the Hindu calendar would be Mārgaśīrṣa or the month of Mrigashiras, which Nakshatra is quite near Sirius. We can now also easily explain why *Dathusho* should have been dedicated to the Creator. Beginning with Fravashinam in the summer solstice, *Dathusho* begins exactly at the vernal equinox, and as marking the revival of nature it was properly dedicated to the Creator. Roth again was partially correct when he imagined that *Dathusho* must have once commenced the year inasmuch as it was dedicated to the Creator Ahuramazda. For from the old Hindu calendar we see that the vernal equinox was also a beginning of the year. In the primitive Avesta calendar we can thus discover the traces of the year, beginning with the vernal equinox and also from the summer solstice (in opposition to the Hindu winter solstice) in Bhādrapada, the month of the manes. These coincidences, especially about the month of the manes, cannot be said to be merely accidental. The worshippers of Ahura-

* The last five days of the old year and the first five days of the new year are called "Fravardigan" days. During these ten days the *frōhars* (*fravashi* or *fravarti*) the spiritual representatives of the deceased are believed to come to the houses of men on the earth. See Dr. Haug's *Essays on the Parsis*, p. 225 note. At present the Hindu feasts extend over the whole of the fortnight. We, however, find an alternative period recorded in the *Nirṇaya Sindhū*, which states that the feasts may extend over a fortnight, ten days or five days!

mazda changed the commencement of the year from the winter to the summer solstice, but as observed by Roth, "a sacred and solemn feast could not be removed from its place in the year,"* and this affords therefore, a comparatively reliable ground to identify the Avesta and the Vedic year. We find nothing in the Avesta to explain why the first month of the year should have been devoted to the manes; but, as observed by Dr. Geiger in respect of the legend of Yama, the knowledge of it might in course of time have been lost to the worshippers of Ahuramazda. We can, however, now easily explain it from the statement in the Vedic works that Phalguni full-moon was once the new year's night at the winter solstice. I know that such analogies taken singly are of no great practical value, but when from a consideration of the Vedic literature, we arrive at results, which we *then* find so similar to those arrived at independently by Zend scholars, we may certainly be led to believe that they are not merely accidental.

[To sum up: Interpreting the passage in the Taittiriya

* See Dr. Geiger's *Civ. An. Iran.*, Vol. I. p. 145. The annual feasts to the manes amongst the Parsis came after the Gahanbars and is interesting to note that the *pitri-pakska* is defined in the *Surya Siddhanta*, xiv. 3-6 as the period of 16 days after the four *Shadashiti-mukhas* or festivals at intervals of 86 days each beginning with Libra. The author of the *Surya Siddhanta* is here evidently describing some old festivals and as *Rashis* were in use in his days he fixes the duration of these festivals according to the calendar then in force. The mention of Libra does not therefore prevent us from regarding *Shadashiti-mukhas* as old festivals. But whether *Shadashiti-mukhas* were in any way connected with the Gahanbars it is not easy to determine in the present state of our knowledge of these festivals.

Sanhita, which states that the "*Phalguni-purna-masa* is the mouth of the year," in the natural way suggested by the context and similar other passages in no less than five Brahmanas, to mean that the winter solstice occurred on the Phalguni full-moon in those days, we find that Mrigashiras has been designated by a name, which, if properly understood, denotes that it was the first of the cycle of the Nakshatras, thus showing that the vernal equinox was once near it; that Mula can now be better understood as the star that rose at the beginning of the first night of the equinoctial year; and finally the fortnight after the summer solstice was devoted to the feast of the manes as the *ayana* of the *pitris* commenced at that point; and that this is fully corroborated by the Parsi month of the manes falling in their primitive calendar at the same time. It was on evidence like this that the old position of the Krittikas was determined, and I do not see why a similar conclusion about Mrigashiras should not be allowed. It is true that no express statement has been cited to show that Mrigashiras commenced the cycle of the Nakshatras in those days and that some scholars may not consider the evidence of *Agrahayani* sufficient for the purpose. In the following chapters I hope to show that there are a number of other circumstances—and even express texts—which leave little room for cautious fears like these.

speaking of. I do not mean to say that single stars may not have been or were not specifically named. But wherever a constellation is spoken of, it is more probable that the whole group was intended, as in the case of the Seven Bears or the Krittikas; and hence the determination of the junction stars, as given in later astronomical works, cannot help us beyond indicating where we are to look for the constellation described in the old works. For instance, if we take Mrigashiras we are told that one of the three small stars in the head of Orion is the junction star. This means that we must look for *Mrigashiras* in the constellation of Orion. But how can these three stars give us the figure of an antelope's head? The three stars are so close that between themselves they give us no figure at all. It is, however, suggested that the two stars in the shoulders and two in the knees of Orion give us the four feet of the antelope, whose head may then be said to correspond with the three stars in the Orion's head. In short, it is the antelope's head in the same way as it is the head of Orion. But besides being open to the objection that this gives us the head and not the *form* of an antelope's head, the explanation presupposes that the whole of the antelope is in the heavens: and if Ardra be correctly identified with the star in the right shoulder of Orion we shall have also to include this star in the four feet of the antelope. The old Vedic works, however, seem to lay down that it was the *head* of the antelope and not the antelope itself, that was transplanted to the heavens. Referring to the legend of Rudra piercing Prajapati, Sayana in his commentary on the Shâtâpatha Brahmana (ii. 1. 2. 8)* observes that he, the

* इयुना तस्य शिरशिष्ठे... इयुः शिरशित्युभयवर्ततस्तिबुध्दुव्यं वक्ष्यते
 शिरशिष्ठे इत्यसि । Sayana's commentary on Shat. Br. ii. 1. 2. 8

terrible form created by the gods, "cut off Prajapati's head by the arrow," and "the arrow and the head both jumped up to the heavens and are there stationed." The Aitareya Brahmana (iii. 33) gives the same story and there too Pashuman or Bhutavan is said to have pierced Prajapati with an arrow. But it does not distinctly say whether it was the head or the body that was pierced by him though in the Shatapatha Brahmana Mrigashiras is described as the head of Prajapati. The tradition of piercing the head does not, however, occur in this form in the Rigveda, though in Rig. x. 61. 5-7 this story of Prajapati is alluded to. But in many places where Indra is mentioned as killing Vritra we are told that he cut off the head of his enemy (i. 52. 10; iv. 18. 9; viii. 6. 7) and in Rig. v. 34. 2 and viii. 93. 14, Indra's enemy is described as appearing in the form of an antelope. This shows that the Rigveda indirectly speaks of an antelope's head having been cut off by Indra, and it may justify us in holding that Rudra did the same. The tradition is preserved even in the Greek mythology which tells us that Apollo, indignant at her sister's affections for Orion, made her hit, with an arrow, a mark in the distant sea, which turned out to be the Orion's head.* In the heavens we must therefore look for the "cut off" head of Mriga with the arrow pierced in it. There are other circumstances which point to the conclusion. Sanskrit writers have described a small group of stars in Mrigashiras called Invakas.. Amarasinha tells us that they are "on the top of Mrigashiras.† Now if Mrigashiras itself be under-

* See Smith's Dictionary of Classical Mythology. Ov. Fast. v. 537.

† Thus—दृगर्ध्वं दृग्धिरस्तस्मिन्नेवापस्यन्ती । इन्धकास्तच्छिरोदेहे तारकाः निवसन्ति वाः । Atara i. 3. 23. तच्छिरोदेहे = दृग्धिरर्ध्वशिरोदेहे according to Bhanu Dikshita.

stood to denote the three small stars in the head of Orion, Invakna became identical with them and the distinction given in Amara must be put aside as meaningless. I am, therefore, of opinion that the asterism of Mrigashiras was once really believed to possess the form of an antelope's head with an arrow sticking to it. The mention of the arrow in these traditions at once enables us to determine the form, for the arrow can be readily and easily identified with the three stars in the belt of Orion. The head with the arrow at the top must therefore be made up by taking along with the belt the two stars in the knees and one in the left shoulder of Orion somewhat as below—



It gives us the arrow pierced into the head and the three stars in the belt are at the top of the antelope's head—a position which Amara assigns to Invakas. I may further observe that the ancient observers could not and would not have selected the three small stars in the Orion's head to form their asterism when there were so many stars of the first and second magnitude in the same portion of the heavens. Then again whatever the later astronomers may say about the junction stars in Mrigashiras, the three stars of that asterism popularly pointed out, even at present, are

those in the belt and not in the head of Orion. I do not mean to imply that the asterism may not have been conceived and figured otherwise. As a matter of fact we know that it was figured as a hunter or a deer, and there are good grounds to hold that these are ancient ideas*. All that I, therefore mean is that of the various figures we may make out of the stars in the constellation of Orion, *one* should be of an antelope's head with the arrow sticking to it to represent the cut off head of Mriga, and not as the present configuration supposes both the body and the head of Mriga together and unseparated.

I have in what has gone above presumed that the asterism of Mrigashiras must be looked for in the constellation of Orion, and that the legends of Rudra and Parajapati refer to this constellation. Some scholars, however, doubt the correctness of this assumption; and so far as *absolute* certainty is concerned their doubts may be justifiable. For, Vedic hymns were not committed to paper till a long time after they were sung, and there is of course no possibility of finding therein a photograph of the portion of the heavens referred to in the various hymns. All that we can, therefore, do is to weigh the probabilities of the proposed identifications; and if this course be adopted I do not think any reasonable doubts could be entertained about the identification of Mrigashiras with the constellation of Orion. To

*The constellation appears to have been variously conceived—(1) the antelope's head; (2) the whole antelope; (3) Prajapati either in the form of an antelope or as a person with a belt or *Yajnopavita* (see the next chap.) Of these three forms I consider the "antelope's head" to be the oldest. It will be seen that the three forms are closely connected, and that they are the developments of the same idea.

quote the words of Prof. Whitney "there is the whole story illustrated in the sky: the innocent and the lovely Rohini (Aldebaran); infamous Prajapati (Orion) in full career after her, but laid sprawling by the three-jointed arrow (the belt of Orion), which shot from the hand of the near avenger (Sirius) is even now to be seen sticking in his body. With this tale coming down to us from the first period of Nakshatras in India who could have the least doubt of its persistent identity from the earliest times to the latest."* I subscribe to every word of what is here so forcibly expressed. Of course, we may expect some variations of details as the story got degenerated into Puranic legends; but it is impossible to mistake the general identity. I shall therefore not unnecessarily dwell upon it here.

We have seen how Mrigashiras may have been primitively conceived. After this it is not difficult to identify the other stars. The Rohini is no other than Aldebaran, Rudra is the presiding deity of Ardra, and we may therefore suppose Rudra to be represented by the star in the right shoulder of Orion (*a*). But the Aitareya Brahmana (iii. 33) identifies Rudra with Sirius, or what is now called the *Mriga-vyadha*. The Milky Way does not appear to have received a specific name in these old days, and the three sections of the Aryan race—the Parsis, the Greeks, and the Indians—have no common word to denote the same. Yet it is impossible to suppose that this broad stream of stars could have been unnoticed, and I shall show further on that it was not. Greek Astronomy places two dogs in this part of the heavens—*Canis Major* and *Canis Minor*—one on each side of the Milky Way, and it has been¹¹ doubted whether

* See Prof. Whitney's *Essay on Hindu and Chinese systems of asterisms*, p. 53.

the claims of these dogs to primitive antiquity are well founded. In what follows, I hope to show that they are. In the meanwhile, I may here refer to the testimony of Plutarch to prove that some at least, of the actually existing figures of constellations in the heavens are Greek transformations of others which had been placed there before by the Egyptians; for this writer, who in his treatise *De Iside et Osiride* makes the priests of Egypt say that the souls of gods shine in the heavens and are stars, adds that "the constellation of Isis is called, by the Greeks, Canis; that of Horns, Orion, and that of Typhon, Ursa."* This statement is very important, inasmuch as it shows that the names of at least three constellations, Orion, Canis and Ursa, are not of Egyptian or Chaldean origin. Of these Ursa Major (Greek *Arktos*) has been already identified with *sapta rikshas* or simply the *rikshas* of the Vedas and the *Haptoiringa* of the Parsis, thus partly confirming the above mentioned statement of Plutarch; and it can be shewn, that his observation is equally good in respect of the other two constellations, or that Canis, Orion and Ursa are all of Aryan origin. At present I use Plutarch's statement only so far as to justify us in presuming the three constellations to be of Aryan origin, or, to put it negatively, not borrowed by the Greeks from the Egyptians.†

* *De Iside et Osiride*. I take the quotation from Narrien's *Origin and Progress of Astronomy*, p. 44. Narrien further observes that this assertion of Plutarch seems to be confirmed by the discovery of a sculptured planisphere on the ceiling of the Temple of Denderah where "in the place of Canis Major is traced a cow, the animal consecrated to Isis" and "instead of Orion is the figure of man which is supposed to be intended for the son of Osiris."

† I have deemed it necessary to make these remarks because Mr. Gladstone in his *Time and Place of Homer*, p. 214, observes that Orion is either "non-Hellenic or pre-Hellenic." Plutarch's

Having thus shown that we are at liberty to assume that the Greek legends about Orion and Canis are not of foreign origin, let us see what coincidences we can discover between the legends of the three sections of the Aryan race about this part of the heavens. I am not going to trace every legend to its primitive source and explain it on the dawn or the storm theory. Nor do I believe that it is possible to do so; for there are many other objects in nature besides the dawn and the storm, that are likely to impress the mind of a primitive man;* and a legend, though it might have originated with the sun or the dawn, is sure to grow and develop under the influence of these objects. For instance, we can understand the story of Vritra by supposing that he represented the power that locked up the waters in the clouds, but when we are told that this Vritra sometimes assumed the form of a Mriga, here is a distinct addition which cannot be satisfactorily accounted for on the original theory. Those that have watched and examined how legends grow can easily understand what I mean. The idea that everything must be reduced to "dawn and nothing but the dawn" is the result of supposing that in the days of the Rigveda men were not acquainted with anything else. The supposition is partly true, but as I shall presently show there are many passages in the Rigveda which presuppose the knowledge of stars and constellations. Thus at the time we are speaking of several ideas had already been

testimony shews that the constellation is not of Chaldean or Egyptian origin. The conception must therefore be pre-Hellenic, or, in other words, Indo-Germanic, and I think I have given ample evidence in this chapter and the next to prove that the idea of Orion was fully developed before the Greeks, and Persis and the Hindus separated.

* See Herbert's *Spencer's Sociology*, Vol. I., Chap. xxiv.

formed and recognised and even familiarly known. For example, the idea of *Devayana* and *Pitriyana* appears to have been well settled at this time, so much so that though the year was afterwards made to commence with the winter solstice, the equinoctial division of the heavens, with all the notions which had already become associated with it, continued to exist, though somewhat restricted in its scope, side by side with the new system. Whether this idea itself is or is not further revolvable into simpler ideas is a different question altogether. Perhaps it may be shown to have grown out of the idea of day and night or light and darkness. There are several passages in the *Rigveda* (i. 123. 7; 164. 47) which speak of a black and a white day, and it is very likely that these were the original names of *Devayana* and *Pitriyana*; for when new ideas are introduced it is usual to express them in old words with such qualifying adjectives as would distinguish the new idea from the old one. A "black day" might thus mean the *Dakshinayana* or the *Pitriyana*, as night appeared to increase at the expense of day during the period. When the southern course of the sun thus came to be likened to a dark day or night (*Rig.* vi. 9. 1) it was naturally regarded as a night of the *Devas* to distinguish it from the ordinary night; and as no sacrifices were performed during the ordinary night, so no offerings could be made to the *Devas* during *their* night (vi. 58. 1). Of course, it must have been a long time before men could develop conceptions like these. There was, indeed, a time when they could hardly account for the fact how the sun found his way from the west back to the east. In the *Rigveda* x. 72. 7, the sun is said to rise from out of the ocean and a similar idea is found in Homer who describes not only the sun, but even the stars, as "bathed

is the waters of the ocean." In the *Rigveda* x. 103. 1; *Sarame* is said to have crossed really a "long way." The *Aitareya Brahmana* iii. 44, which states that the sun never sets in reality, makes a distinct advance upon these notions. But it is difficult to say whether astronomical ideas were developed to such an extent in the days when the year first commenced from the winter solstice. I do not, however, wish to enter here into these details. As previously observed I assume that, at the time we are speaking, the Vedic Aryans had already passed through these stages, and that the ideas of *Devayana* and *Pitriyana* were familiarly known and established; and assuming these as established, I intend to examine how legends were built upon them. I have, however, briefly alluded to the probable origin of these ideas inasmuch as it helps us to better appreciate the description of the *Devayana* and the *Pitriyana*. Ordinarily the *Pitriyana* is described (*Rig.* ix. 113. 8) as the region "where *Vaivasvata* is the king, which is the undermost (lit. obstructed†) part of the heavens, and where there are eternal waters." The *Vaivasvata Yama* here spoken of does not, however, appear to have as yet been invested with the terrible character we find given to him in the later literature. Corresponding to *Yama* in the south we have *Indra* in the north, each supreme in his own sphere, and dividing the whole world into two parts, one bright and known, and the other watery and mysterious, or, in the language of seasons, first

* Lewis. *Hist. Survey of the Astronomy of the Ancients*, p. 6. *Iliad*, v. 6, vii. 422.

† अनावरोधनं दिवः in the original. I think अवरोधन means "when the view of the heavens is obstructed;" "the portion of the heavens which is turned away." Cf. *Ait. Br.* iv. 14, where अवरोधन of the year is spoken of.

comprising Vasanta, Grishma and Varsha and the second Sharad, Hemanta and Shishira.

Now when the vernal equinox was in Orion or Mrigashiras it was the beginning of the Deveyana, and as the constellation is remarkable for its brilliancy and attractiveness the ancient Aryans may have been naturally influenced not merely to connect their old traditions with it, but also to develop them on the same lines. Thus the Devayana and the Pitriyana, as representing the two hemispheres must be joined, and the vernal and the autumnal equinoxes became the natural points of union between the regions of gods and Yama. The equinoxes were, in fact, the gates of heaven, and as such it was natural to suppose that they were watched by dogs. In the Rigveda i. 48. 15 the dawn is spoken of as illuminating the "gates of heaven," and in i. 13. 6 and ii. 3. 5 the gates-deities are invoked to keep the gates open. We have a similar invocation in the Vajasaneyi Sanhita 21. 49. This shows that the idea of the "gates of heaven" was not unknown in Vedic times, and the arrangement of the gates on the sacrificial ground, which is prepared on the model of the annual passage of the sun, shows that these gates divided the whole hemisphere into two parts. Macrobius records a tradition that "the ancients designated the signs of Cancer and Capricorn as the gates of the sun, at which having arrived, the luminary seemed to retrace his path in the zone which he never leaves."* Now Macrobius could not but speak in the language of the twelve zodiacal portions, and if we therefore divest his statement of the form in which it is naturally expressed it

* Macrob. Comment. in Somn. Scrip. Lib. I. chap 15. I take the quotation from Narrien's *Origin and Progress of Astronomy*, p. 51.

means that the equinoxes, which the ancients supposed to be once in the zodiacal signs named above, were then called gates of heaven.

The Iranians, however, have preserved the legend more fully. With them the equinox is not merely a gate, but a bridge connecting heaven and hell—the Devaloka and the Yamaloka, or the Devayana and the Pitriyana—and “dogs that keep the Chinvat Bridge” help the departing soul to cross it. Darmesteter, in his introduction to the *Vendidad*, published in the *Sacred Books of the East Series*, observes* that “this reminds one at once of the three-headed Kerberos watching at the doors of hell and still more of the four-eyed dogs of Yama, who guard the ways to the realm of death” (*Rig. x. 14, 10*). The ideas are, indeed, strikingly similar and point out to a common source. Kerberos has even been identified with Sanskrit *Shabala* or *Sharvara*, meaning variegated or a dog of Yama. But, as far as I know, no satisfactory explanation has yet been given of these legends nor any attempt made to explain them on a rational basis.† If we, however, suppose that the vernal equinox was once in Orion, the constellations of Canis Major and Canis Minor—the two dogs—would then be on the boundary line of heaven and Yama’s region, and the whole of the above story may be seen illustrated in the sky like that of Prajapati and Rudra previously referred to.‡ According to Bundahis

* *Sacred Books of the East*, Vol. IV., *Zend-Avesta*, Part I., Introduction v., 4.

† See Kaegi’s *Rigveda*, by Arrowsmith, p. 160, note 274a, where the writer quotes Aufrecht to the same effect.

‡ Weber and Zimmer appear to have suggested that the conception of Yama’s dogs might have been formed from some constellations. Bloomfield rejects this suggestion and tries to show

xii. 7, the Chinvat Bridge extends from the height of Chakad-i-Daitak in the middle of the world to the summit of Arezur at the gate of hell; while Dr. Geiger observes that "it was believed to have been built over a wide expanse of water which separates the paradise from this world."* In the later Indian literature we are told that the souls of the deceased have to cross a stream† before they reach the region of Yama, while the story of Charon shows that even the Greeks entertained a similar belief. What could this river be? With the vernal equinox in Orion, one can easily identify it with the Milky Way, which could then have been appropriately described as separating the regions of gods and Yama, the Devayāna and the Pitriyāna, or the Northern and the Southern hemisphere. In the later Hindu works it is actually called the Celestial River (*svar-*

that the dogs represent the sun and the moon. His explanation does not, however, show how and why the dogs came to be located at the gates of heaven and why they should be entrusted amongst all the sections of the Aryan race with the duty of watching the souls of the dead. Bloomfield quotes Kath. S. xxxvii. 14 (where day and night are called the Dogs of Yama) and Shat. Br. xi. 1. 5. 1. (where the moon is said to be a divine dog) to prove that the dogs must be understood to mean the sun and the moon. But I think that the Brāhmana here gives simply a conjectural explanation, and, as in the case of Namuchi's legend, we cannot accept it, inasmuch as it does not give any reason why the dogs were stationed at the doors of Yama's region. They are many other incidents in the story which are not explained on Bloomfield's theory. I see, therefore, no reason for modifying my views which were put down in writing before I could get Bloomfield's paper in the last number of the Journal of the American Oriental Society.

* Dr. Geiger's *Civil. of East Iran.*, Vol I., p. 100.

† Called Vaitāraṇi. The *Garuda Purāṇa*, Pretak. vi. 25-31, states that a cow should be given to a Brāhmana to enable the deceased to pay the ferrymen on this river.

nach), while the Greeks have placed near it the constellation of Argos (ship) and two dogs—Canis Major and Canis Minor—one on each side to guard both the entrances of the Chinvat Bridge across it. The Rigveda also mentions two dogs of Yama kept to “watch the way,” while the Greeks place a three-headed dog at the gates of hell. In Rig. x. 63. 10 we are further told that the land of the blessed is to be reached by “the celestial ship with a good rudder.”* The words in the original are *daivim navam*. Comparing these with the expression *divyasya shunah* in the Atharva Veda vi. 80. 3, and seeing that a celestial (*divya*) representation of Rudra is described in later works† it seems to me that we must interpret the epithet to mean “celestial” and not simply “divine.” Thus the Vedic works appear to place a celestial dog and a celestial ship at the entrance of the other world, and these can be easily identified with the Greek constellations of Argo Navis and Canis, if we suppose the Milky Way to be the boundary of Heaven in these days. I do not mean to say that these conceptions had their origin in the appearance of the heavens. On the contrary, a comparison with the non-Aryan legends shows it to be more likely that the heavenly bodies received their names from the pre-existing beliefs, about the other world, amongst the people. Herbert Spencer tells us that amongst the non-Aryan savage races the journey to the next world is believed to lie over land, down a river or across the sea, and that in consequence the practice of burying their dead in boats prevails amongst some of them.‡ The North Americans,

*See Kaegi's Rigveda, translated by Arrowsmith, p. 159, note 273

† See the passage from the Mahimna Stotra, quoted *infra*.

‡ See Herbert Spencer's *Principles of Sociology*, Vol. I., chap. xv., 1st Ed.

we are further told, say that the Milky Way is "the Path of Spirits, the Road of the Souls," where they travel to the land beyond the grave, and where their *camp fires* may be seen blazing as brighter stars."* This coincidence between the Aryan and the non-Aryan legends makes it highly probable that the figures of the constellations were conceived by the Aryans according to notions of the next world prevailing amongst them at that time. It may be noticed, however, that the non-Aryan races do not connect the idea of time *e. g.*, of the year and the seasons, with these beliefs, while it is the *chief* characteristic of the Aryan legends. We are, for instance, told that the dog commenced the year (Rig. i. 161. 13) and that the Devayana comprised the three seasons of Vasanta, Grishma and Varsha (Shat. Br. ii. 1. 3. 1). † It is this feature of the Aryan legends that is most important for the purpose of our enquiry, while the coincidence, above pointed out, confirms, in a remarkable way, the genesis of the Aryan legends here proposed. The chief elements in the traditions of the three Aryan nations may thus be satisfactorily explained.

It may, however, be contended that the two dogs of Yama spoken of in the Rigveda may not be the same as the Avesta dogs at the Bridge. A closer examination of the several passages in the Rigveda, will, however, dispel such doubts. In the Vendidad xiii. 9, the dogs are called *peshu-pana*, or those that guard the way to the region of death. The Avesta dog is *chathru-chashmen* (Ved. viii. 16), while the Vedic dogs are described as *chatur-akshau* (Rig. x. 14. 11), both of which expressions mean "four-eyed." The dogs in the Avesta and the Rigveda, however, differ in colour.

* *Principles of Sociology*, Vol. I., chap. xxiv., p. 399, 1st Ed.

† For German legends, indicating time, see the next chapter.

In Ved. viii. 16 the dogs are said to be *zairitem* or *spattem* *zairi-gaeshem*, yellow or white with yellow ears; while the dogs of Yama are said to be *shabalam*, spotted or variegated. But the difference is neither very material, nor such as cannot be accounted for. In the Rigveda we can trace the yellow colour of the Avesta dogs. The antelope of the sun in Rig. x. 86. 3 is said to be *harita* or yellow, the *zairitem* of the Avesta, and if we suppose this antelope to be no other than that represented by Orion, as the sun commenced the year at that point, we need not be surprised if the dogs in the Avesta are described as yellow, especially when in the Atharva Veda viii. 1. 9 we find the two messenger dogs of Yama named as *Shyama* and *Shabala*, thus noting probably a difference in colour. The Atharva Veda iv. 20. 7 mentions a four-eyed bitch, while in the Shatapatha Brahmana xiii. 1.2.9 the adjective is applied to a dog; and the same animal is evidently intended in both places. In the Parsi scriptures the dogs at the Chinvat Bridge are sometimes spoken of in singular (Ved. viii. 16) and sometimes, as in Rig. x. 14. 11, in dual (Ved. xiii. 9). This shows that we might disregard gender and number in the description of these dogs; and we are thus led to suppose that Sarama in the Rigveda is again to be identified with the dogs that watch the gates of heaven. Whether Sarama* in primitive days was or was not connected with the dawn, I do not undertake to say. But there is an incident in her story which confirms the identification I have proposed. The Panis tried to coax Sarama by offering her milk which she drank. On her return she denied having seen the cows of Indra, who thereupon kicked her

* See Max Muller's *Lectures on the Science of Language*, Vol. II., p. 511.

and she vomited the milk. Now the mention of milk at once suggests the idea that it must be the milk in the galaxy on each side of which the two dogs are stationed. In Rig. iv. 57. 5 Shunasirau are invoked in order that they may pour down upon the earth the "milk," which they "make in heaven." Prof. Max Muller records a suggestion that Shunasirau, here spoken of, may be a very old name for the Dog-star, and with it derivative *Sairya* would give us the etymon of *Seirios*.* In Rig vii. 55. 2 the Vastoshpati, "the guardian of the house," in the form of a dog, is invoked and described as bright and red *Sarameya* on whose jaws spears seem to glitter: a description which answers so well with the appearance of Sirius, that with what has been said above we may at once identify the *Sarameya* with the Dog-star. I may here refer to the *Shatapatha Brahmana* ii. 1. 2. 9, where speaking of *Mrigashiras*, the Prajapati's body pierced by Rudra is described as his *vastu*. May not Vastoshpati be regarded as guardian of this? If so, it may be a further proof that Vastoshpati represents the star Sirius, which, as it were, guards the head of Prajapati in the form of Orion or the antelope's head. But, apart from this suggestion, I would finally quote Rig. i. 161. 13, where it is expressly stated that "the dog awakened" the Ribhus, the genii of the seasons, at the "end of the year." Sayana proposes to interpret *shvanam* in the original by "wind," but it is evidently an error. In the *Shatapatha Brahmana* xiii. 5. 1. 8, *vrika* and *shva* are mentioned together, and the former is known to be a name for a wild dog. If so, Sayana's explanation of Rig. i. 195. 41 appears to be more probable than that of Yaska. It is in

* Max Muller's *Lectures on the Science of Language*, Vol. II., p. 526.

fact a description of the dog (star) appearing in the east after crossing "the eternal waters" of Yamaloka, and then being immediately lost in the rays of the sun, which rising after it, had to push the wild dog out of his way. The mention of the "eternal waters" of the Yamaloka indicates that the heliacal rising of the Dog-star, here referred to, occurred at the end of the Pitriyana or at the vernal equinox, thus further confirming the statement that the dog commenced the year. There are other passages of similar import, but as I wish to avoid, for the present, any disputed passages, I do not mention them here. If the time, I am contending to establish for the hymns of the Rigveda, comes to be accepted, it is sure to furnish an unerring clue to the interpretation of many other passages and legends in that sacred book, but the work must be left to be done hereafter.

Putting all these passages together, we find that in the Rigveda, dogs are described as dark and brown, bright and red, possessing four eyes, guarding the house and the way of Yama's region, vomiting and making milk, and above all beginning the new year.* All these facts clearly show that the Vedic dogs are the same as the Hellenic or the Iranian, and we can easily and satisfactorily account

* Prof. Bloomfield's theory leaves many of these facts unexplained. If the dogs represent the sun and the moon, how can the sun tell the Ribhus that the dog awakened them at the end of the year? I cannot also understand how the sun and the moon can be described as variegated in colour, or as engaged in making milk. Again how can the sun or the moon be said to be four-eyed and why should they perpetually remain at the boundary of heaven and hell? In Rig. x. 86. 4, a dog is said to be let loose at the ear of the Mriga, and this as well as the dog in Rig. i. 161.13, must be supposed to be different from Yama's dogs, if we accept Bloomfield's view.

for all these legends by supposing that the vernal equinox was near the Dog-star in those days, thus making the dog rise with the sun in the beginning of the year at the gates of the Devayana. We can now also understand how the dogs could have been described as four-eyed. For, if they are correctly identified with Canis near the Milky Way, then the four stars in the body of Canis might naturally be said to be his eyes;* for once the number of eyes is increased from two to four, we need not expect to find them all on the head, but, like the thousand eyes of Indra in the later mythology, they may be regarded as spread over the whole body. M. Darmesteter rightly observes† that "the Parsis being at a loss to find four-eyed dogs interpreted the name as meaning a dog with spots above the eyes; but it is clear that the two-spotted dog's services‡ are only accepted

* In Rig. x. 127. 1, the stars are said to be the eyes of night. The Greeks entertained a similar idea. Their Argos was surnamed Panoptes, "the all-seeing," having a hundred eyes on the body. See Max Muller's *Science of Language*, Vol. II., p. 416.

† Sacred Books of the East Series, Vol. IV.; *Zend Avesta*, Part I.; Intro. v. 4.

‡ These services are required at the funeral ceremony. It may be here noted that the hymn in the Rigveda which describes Yama's dogs (Rig. x. 14) is still recited at the time of burning the dead body of a Hindu. Every Brahman has also to give, every day, two small offerings of cooked rice to the two dogs of Yama, Shyama and Shabala, at the time of the *Vaishvadeva* sacrifice. Several deities receive their oblations at this sacrifice. The offerings are placed on the ground in the form a circle, beginning with the eastern point. The offering to Shyama is placed outside the circle at the south-west and that to Shabala at the north-west point. In other words, Shyama and Shabala are placed on each side of the

for want of a four-eyed one, or of a white one with yellow ears." Evidently the Parsi priests failed to realise that it was the divine or heavenly, and not an earthly dog that was here described, as driving the death-fiend. The Atharva Veda vi. 30. 3 shows that the Indian priests of the time well understood it to mean a dog who is "born of waters, whose house is in the sky, and who sheds his lustre all around."

There is another set of traditions which we can similarly explain on the supposition with which we have started, *viz.*, that the vernal equinox was then in Orion. The heliacal rising of the constellation at the beginning of the year marked the revival of nature at the commencement of spring, and the asterism may thus be said to represent all these milder influences which in later mythology were fully embodied in the conception of Vishnu. But the case was completely reversed if we take the acronycal rising of the same. It was at the autumnal equinox that the Dog-star rose at the beginning of night, and though, strictly speaking, it marked the end of Varsha, yet the portion of the heaven wherein the constellation is situated could have been easily regarded as the battle-ground of Indra and Vritra who fought in those days, and also as the stage on which the terrible Rudra made his appearance. In short, the constellation naturally became the harbinger of the mild and the terrible aspects of nature. It is in this latter sense that the Dog-star might be considered a rain-star, and Sarama, like the Greek Hermes with which it is identified, might be said to have been sent to search for the cows of Indra taken away by the Panis of the nether world. The Greek legends mention western point, in the same way as the dogs appear in the heavens on each side of the Milky Way.

two watch dogs—Kerberos and Orthros; and of these Kerberos has been etymologically identified with *Sharvara* and Orthros with *Vritra*.* But no explanation has been given of how this Vritra came to be stationed at the gates of hell. Prof. Max Muller suggests that Orthros in the dark spirit that is to be fought by the sun in the morning. But then, this does not explain why it was called Vritra, and how it came to be killed by Herakles. The legend of Namuchi, as given in the Rigveda and interpreted on the supposition that the year began with the Dog-star, does, however, solve the difficulty. I have already alluded to the fact that in the Rigveda Vritra is often said to appear in the form of a *Mriga* (Rig. i. 80. 7; v. 32. 3; v. 34. 2; viii. 93. 14). In Rig. vii. 19. 5 Vritra and Nimuchi are both said to be killed by Indra, and though this cannot be taken as a direct authority for holding that Vritra and Nimuchi are the different forms of the same enemy, yet from the description of the two I do not think there can be any doubt as to their being identical. In fact, Shushna, Pipru, Kayava and Nimuchi† are only so many different names of the enemy of Indra. Now Indra is represented as cutting off the head of Vritra (Rig. i. 52. 10), and also of Namuchi (Rig. v. 30. 7; vi. 20. 6). Combining these statements we get that Indra cut off the head of Vritra or Namuchi, in the form of a Mriga; and this at once suggests the question whether that head is not the same as that of Prajapati cut off by Rudra and which gave the name of

Max Muller, Gifford Lectures, 1891, p. 248, *Biographies of Words*, p. 197.

† See Pro. Bloomfield's contributions to the Interpretation of the Veda in the Journal of the American Oriental Society, Vol. XV., p. 146.

Mriga-shirsha, or "the antelope's head" to the constellation. In Rig. i. 53. 7, we are simply told that Namuchi was killed by Indra in the distant (*paravati*) region, which seems to mean the region of Yama. But as it does not satisfactorily determine the place where Namuchi was killed, I refer to Rig. x. 73. 7, where Indra by killing Namuchi is said to have cleared up "the paths leading (*yana* in the original) to the (region of) Devas,"* which plainly shows that Namuchi was killed at the gates of the Devayana. In the Vajasaneyi Sanhita 10. 14 a sacrificial rite is described which gives the same place and time of Namuchi's death. The priest there throws away a piece of metal hidden under a tiger hide, exclaiming, "the head of Namuchi is thrown away," after he has taken his *Yajamana* through all directions (East, South, West, North and upwards) and also through all the seasons (Vasanta, Grishma, Sharad, Varsha and Hemanta-and-Shishira). This means, if it can mean anything, that Namuchi *alias* Vritra was killed, in the language of seasons, after Shishira, or in other words, at the get of the Devayana as described in the above quoted passage from the Rigveda, for the end of Shishira is the end of the Pitriyana. Here then we have an explanation of how Orthros came to be at the gate of hell, or in a distant region under the setting sun. But the association of Orthros with Kerberos throws further light on the subject. If Vritra's head is the same as Mriga-shirsha, as explained in the beginning of this chapter, then the three stars in the belt of Orion, which form the top of Mrigashiras, might have easily suggested the idea of a three-headed monster. In Rig. x. 99. 6

* The original verse is as follows —

तं चर्चय नमुचि मरुत्युं दातं कृत्वा न क्रये विनाशं ।

तं चर्चय मनवे स्वोनान्यथो देवत्राजं देव यानान् ॥

Indra is said to have killed a three-headed and six-eyed monster. It might be contended that the explanation is not satisfactory, inasmuch as the head of *Mriga* is here supposed to be again conceived as a dog, while there is no authority in the Vedic works expressly describing *Mriga* as a dog. But if *Orthros* has become a dog in the Greek mythology, while it is a *Mriga* in the Vedas, I see no reason why *Kerberos* should not get his three heads from the *Tri-shirshan* of the Vedas. The difficulty is not at all a serious one. In bringing together the traditions of the three Aryan races after thousands of years, we must make some allowances, and be satisfied with a general similarity of the stories. The asterism of *Mrigashiras* and the dogs are so close, that one might be easily mistaken for the other, when all the knowledge of the original traditions was lost. It is thus that we can account for the fact that out of the three beings that were represented in this portion of the heavens, *Rudra* (the hunter), *Mriga* (the antelope), and *Shva* (the dog) the Greeks retained in the sky only the hunter (*Orion*), and the dog (*Kuon*,* *Canis*), with nothing to hunt, while the Hindus have not only forgotten, but condemned, the dog.

The Parsis, it is true, have not mistaken the dog, but still as regards complexion, they have represented their dogs as possessing the colour which in the *Rigveda* is given

* The principal star in *Canis Minor* is still called *Procyon* = *Gk. Prokuon*, *Sk. Prashvan*, the Foredog. It shews that the previous star was once called *Kuon* by the Greeks. If we count the *Nakshatras* in the direction of the sun's annual course, *Kuon* comes first, and *Prokuon* afterwards. Cf. Sanskrit *Radha* and *Amuradha*, of which like *Procyon*, later writers have only retained *Amuradha*. *Phalguni*, *Ashadha*, and *Bhadrapada* are similarly divided into *Purva* and *Uttara*, the preceding and the foregoing.

to the antelope of the sun. Another objection that may be urged against this identification is that we are required to suppose Mrigashiras to be once the head of Prajapati, and at another time that of Vritra. It must, however, be remembered that we do so on the express authority of the Rigveda, and that besides it is quite natural to suppose that once the antelope's head was said to exist in the heavens, Vedic poets vied with each other in weaving legends out of it. As an illustration I refer to Rig. x. 86. 5, where the poet describes Vrishakapi's head as cut off, but soon after Vrishakapi is told that it was an illusion, and that in reality it was some one else whose head was so severed (verse 18). This clearly shows that it was a period when legends were still being formed out of the "antelope's head."

We can now explain how later writers evolved a myth out of Namuchi's death. The story is given in the Tandya Brahmana (xii. 6. 8).* There we are told that Indra and Namuchi came to a settlement that the former should kill that latter, neither during day nor by night, nor by any weapon, whether dry or wet. Indra therefore killed him with the foam of the waters at the junction of day and night, when it had dawned, but yet the sun had not risen. It is probably this circumstance that has led Professor Max Muller to suppose that Orthros represents the gloom of the morning. But the explanation does not account for the other

* See also Taitt. Br. i. 7. 1. 7; Shat. Br. xii. 7. 3. 3. Also the Puranas, Ramayana iii. 30. 28; Mahabharata Udyoga p. ix. 29. Prof. Bloomfield has collected all such passages in his article on the contributions to the Interpretation of the Veda in the Journal of the American Oriental Society, Vol. XV., pp. 148-158; The legend of Hiranya-Kashipu in the Puranas appears to have been based on Namuchi's story.

incidents in the story. Was Namuchi or Vritra killed every morning by Indra? Or was it only at the beginning of the rainy season? Evidently the latter. We must then suppose that Namuchi was killed after dawn, but before the actual daybreak, at or during the monsoons. In other words, the junction of day and night in the later myths must be understood to mean a particular junction of day and night in the rains, or more definitely, the junction of the day and the night of the Gods—the junction of the Pitriyana and the Devayana, the gates of which are said to be cleared up by Namuchi's death in the passage from the Rigveda given above. The latter part of the legend is, however, still more poetical, and Prof. Max Muller's theory leaves it entirely unexplained. Indra is here said to have killed Namuchi with a weapon which was neither dry nor moist—the watery froth. This is evidently based upon Rig. xiii. 14. 13, where Indra is described as "cutting the head of Namuchi with the foam of waters," and the same incident is again referred to in Rig. x. 61. 8. Therefore, even if we reject later speculations with respect to "why foam or froth should have been used," and decline to solve the question by assuming a compact* between Indra and Namuchi, yet we have to account for the fact that in the Rigveda itself Indra is said to have used the foamy weapon to destroy his enemy. What

* Prof. Bloomfield has discussed this legend in a recent number of the Journal of the American Oriental Society (Vol. XV., Number II.), but he gives no explanation of the compact between Indra and Namuchi. In my opinion it is impossible to hold that the compact could have been the original basis of the legend. It is evidently a later invention to explain what were then deemed otherwise inexplicable incidents in the legend; and until these incidents are explained in a natural way, the legend cannot be said to be properly understood.

could this foamy weapon be? If Namuchi was killed at the gates of the Devayana and his head still lies there, the watery foam could be no other than the broad belt of the Milky Way which crossed the heavens at the same part. The blue vault of the heavens is often compared to an ocean in the later Sanskrit literature,* and the stars are said to be the patches of foam upon its surface. Thus in the Mahimna Stotra, which is considered to be at least seven or eight hundred years old, the author describes (verse 17) the heavenly form of Rudra (*i. e.*, Rudra as represented in the sky), and tells us that the stream of waters on his head has "the beauty of its foamy appearance enhanced by a number of stars."† This is a description of the Ganges on the head of the celestial form of Shiva, and the author of Mahimna, who, in verse 22, refers to the story of Rudra piercing Prajapati with an arrow, and says that the whole story is still illustrated in the sky,‡ evidently meant to

* Cf. Sahitya Darpana 10, where under अपङ्कति we have—

येन नमोर्नडलमंडुराकिर्नेलाध तारा नवकेनमंगाः ।

† दिव्यदृग्भाषी तारागणगुणितकेनोद्गमसचिः

प्रवाही वारां नः पृथक्तलत्रु इष्टः क्षिरसि ते ।

नगद्वीपाकारं जलधिबलत्वं तेन कृत-

मिच्छन्नेनैवोभेकं धृतमहिम दिव्यं तव बभूव ॥

The conception of Shiva embodied in this verse is really a grand one. The poet asks his reader to imagine how great must Shiva be, the celestial stream on whose head encircles the Universe! The Milky Way which girdles the celestial sphere cannot be better described.

‡ प्रभागाय माध प्रसन्नमनिकं स्त्रीं दुहितरं

नरं रोहितां रिरनविपुदृग्बल्य वपुषा ।

बभूवनेनैव दिवमपि सपत्नीकृतनेन

नरैतं सेऽप्यापि स्वजाति न दृग्बल्यधरमसः ॥

Also Cf. Shakuntala, i., सुगानुसारिणं साक्षारपद्मानीय पिनाकिनम् ।

by it the Milky Way which passes over the head of the star of Rudra. Now if the poetic imagination of the author of *Mahimna* can perceive foam in the Milky Way, I see no reason why the virgin imagination of the Vedic poets should not rise to that pitch. Dr. Haug, speaking of the Vanant Yashta, observes that the constellation (Vanant), by which the Parsi Dasturs understand the Milky Way is said to stand directly over Hell, and further, "the Dasturs are of opinion that this constellation is the weapon (*Vazra*) which is constantly aimed by Mithra at the head of the *Daevas*, as stated in the *Khurshed Yasht*."* Referring to the *Khurshed Yasht* we simply find that the club (*Vazra*) of Mithra "was well struck down upon the skulls of the *Daevas*."† The information given to Dr. Haug may therefore be traditional among the Parsi Priests; but whether traditional or otherwise, as it comes from an independent source, it is strong corroborative evidence to support the identification of Indra's foamy weapon, with the stream of the Milky Way in the heavens. With the vernal equinox near the Dog-star, the Milky Way, which then separated the region of gods from that of Yama, could well be said to be over Hell and "well struck upon the heads of the *Daevas*." Namuchi's legend can thus be simply and naturally accounted for, if we assign to the equinoxes the position which we have deduced from other passages in the Vedic works. I may point out that we do not hereby account for the original idea of *Vritra*. That is evidently a still older legend. But his existence at the gate of Hell and his decapitation by the foamy weapon—the two chief

* Dr. Haug's *Essays on the Parsis*, p. 271, note.

† *Sacred Books of the East Series*, Vol. XXIII., *Zend Avesta* Part II., p. 87.

elements in the later Vedic traditions are satisfactorily explained by placing, as originally proposed, the vernal equinox in the constellation of Orion, and identifying Namuchi *alias* Vritra with the constellation of Mrigashiras or the antelope's head, situated just below the Milky Way.

We have next to deal with the legends of the bold hunter, the terrible Rudra chasing the antelope. Several attributes in the Puranic mythology, *e. g.*, his bearing the Ganges, in his matted hair, his fondness for the burning ground, and his appearance as Kirata or hunter, are all accounted for by placing Rudra just below the Milky Way or the celestial Ganges,* at the gates of the Pitriyana and figured as a hunter. I have already alluded to the difficulty of identifying Rudra. But whether we take the star of Ardra or Sirius to represent the lord of cattle, the above attributes remain the same. But neither these legends, nor the story of Rudra chasing Prajapati, which, so far as it was necessary for our present purpose, has been already given, can help us, in a material degree, to solve the question under consideration. I wish, therefore, to deal here only with such traditions as point out to the position of Rudra in the course of the year. Rudra as the lord of the cattle and the presiding deity of storms, can be at once recognized and placed in the rainy season. There are, however, other legends indicating time more definitely. In Rig. x. 192. 2, *Samvatsara* or the year is said to rise out of the ocean, the place where Vritra was killed (Rig. x. 68. 12). Prajapati, as represented by Orion, may also be naturally supposed to commence the year when the vernal equinox was in Orion. Rudra killed Prajapati, and, as

See Mahimna Stotra, verse 17, quoted *supra*.

I have shown before, Prajapati, Samvatsara and Yajna were convertible terms. Rudra therefore killed Prajapati or Yajna at the beginning of the year; and Yajna also meant sacrifice. Rudra was therefore naturally believed to have killed the sacrifice—thus giving rise to the Puranic legends of Rudra routing the sacrifice of Daksha. At the end of the Sautika Parva in the Mahabharata* we are told that “Rudra pierced the heart of Yajna or sacrifice with an arrow. Thus pierced the Sacrifice, with fire, fled away in the form of an antelope and having reached the sky, there shines in that form, followed by Rudra.” Thus it was that Rudra acquired the title of Sacrifice-breaker. In the Tandya Brahmana vii. 2. 1, the death of Prajapati is, however, spoken of as voluntary. In Taitt. Br. iii. 9. 22. 1, he is said to have assumed the form of Yajna and given himself up to the Devas to be sacrificed. The Devas killed him on their morning, and so every one should similarly perform the Ashvamedha sacrifice at the beginning of the year. One can now understand what the meaning of these stories is. They refer to the death of Prajapati by Rudra at the *beginning of the year*; and thus it was that Yajna, meaning the year was sacrificed by means of Yajna or Prajapati Rig. x. 90. 16., where we are told that Gods sacrificed Yajna by Yajna; but this (human sacrifice) was an old (out of date) practice, may also be similarly interpreted. I cannot say which of

* Maha. Saut. 18, 13-14 —

ततः स यज्ञं विव्याध रश्मिं हृदि यजिषां ।

अपक्रांतस्ततो बहो मृगो भूत्वा सपादकः ॥

स तु तेनैव रूपेण दिवं प्राप्य व्यराजत ।

अन्वीयमानो ह्येष बुधितिर नमस्तले ॥

Here the antelope is said to be pierced in the heart and not in the head as in the Vedic works. It appears, therefore, that the whole antelope was considered to be in the heavens at this time.

these legends is older, whether that of Prajapati sacrificing himself, or of Rudra killing him at the beginning of the year. But whichever of these be the older one it does not affect our present question. Both of them indicate that Prajapati once commenced the year and that he either willingly allowed himself to be sacrificed or was killed by Rudra at that time. As another indication of time, I may point out that the time prescribed for the sacrifice of Shulagava in Ashvalayana Grihya Sutas, 4.9.2, is in Vasanta or Sharad with the asterism of Ardra. The passage, as now understood, means that the sacrifice should be performed on any day in Vasanta or Sharad when the moon—whether full, half, quarter or new—is near the asterism of Ardra, the star over which Rudra presides. But it appears to me that here we have a tradition that the sacrifice was originally required to be performed at the new or full moon in the vicinity of Ardra, in Vasanta or Sharad, thus indicating that the vernal equinox was near Ardra when the sacrifice was originally established. When the seasons receded Ardra new or full moon could not fall in Vasanta or Sharad and therefore Ardra-night afterwards came to mean any night when the moon is near the asterism of Ardra in Vasanta or Sharad. However, as the point is not quite satisfactory I shall not press it here. The only other fact about Rudra worthy of notice is that he seems to be described as followed by dogs or rather as their master (Vaj. San., 16.27).^{*} This may shew that the Vedic poets knew of the dogs near the star of Rudra.

^{*}In the original there are salutations to several forms of the deity, but it would not be quite safe to infer from it that Rudra was, as a matter of certainty, followed by dogs. In Tand. Br. xiv. 9. 12, Shiva is described as *Mrigaya*, while the passage in Vaj. San. (16. 27) says *अग्निं रुद्रं वृकं वृकः*

I have already alluded to the Parsi legends of the Chinvas Bridge and the dogs that keep it. There is, however, one more circumstance to which I wish here to refer. The star Tistrya has been identified with Sirius and the identification, if not absolutely correct, is at least sufficiently so for general purposes. But I think that the word itself has not been yet satisfactorily explained. I propose to derive Tistrya from *Tri-stri* which in Sanscrit means three-stars, *Tri-stri* may easily be corrupted into *Tistri*, *Tister*. *Tister* is, therefore, the same as *Kerberos* or *Trishiras* and the fact that Tistrya is called *Tir* or arrow in Modern Persian further confirms this derivation, for the *Aitareya Brahmana* (iii.33) calls it the three starred or tripartite arrow of *Rudra* in the sky. I have in the last chapter shown that if we commence with the summer solstice and regard *Fravashinam* as the first month of the year, *Tistrye* corresponds to *Margashirsha*. If *Tister* is understood etymologically to mean the belt of *Orion* this coincidence of the months can be better accounted for. I am therefore of opinion that Tistrya should not be identified with *Sirius*, but with the belt of *Orion*. We can then better understand why the star should have been spoken of as *Tristryeni** probably indicating more stars than one and also *Pauriyeni*, the first. The Parsis have

* As the word is understood at present it means "pertaining to or belonging to Tistrya." But grammatically it may mean "many stars or group of stars." I may here point out that if we identify Tistrya with *Sirius* the etymology is not explained, nor can we account for the Modern Persian name *Tir* which again means an arrow. While if we identify Tistrya with the three stars in the belt everything is satisfactorily accounted for. All the arguments based upon the "rain-producing" influence of the star are equally applicable in either case, since both the stars (*Sirius* and *Orion*) rise at the same time. See Dr. Geiger's *Civil. of East Iran.*, Vol I., pp. 141-142.

preserved another interesting relic of the asterism of Mrigashiras, but I reserve it for the next chapter.

Starting with the supposition that the vernal equinox was in Orion, we have thus an easy and a simple explanation by which the three principal deities in the Hindu mythology can be traced to and located in this part of heavens. Vishnu representing the happy times of Vasanta, Rudra presiding over storms and Prajapati, the deity of sacrifices beginning the year, were all combined in one place. It was here that Vishnu killed Varaha (Rig. i. 61. 7); it was here that Indra killed Vritra, and it was here that Rudra chased Prajapati, in the form of Yajna or that he sacrificed himself. The celestial Ganges separating the upper and the nether world was also in the same quarters, and through it lay the path to Yami's region. In a word the Trinity of the Hindu Pantheon was fully represented in the constellation of Orion, when the vernal equinox was there. Later writers describe this Trinity as represented by the three-headed Dattatreya, followed by the Vedas in the form of dogs; and after what has been said above, I think we can have no difficulty in identifying this personified Trinity with Orion having three stars in the head and closely followed by the dog (Canis) at its foot. It will be difficult to find another place in the heavens where all these elements are combined in such an interesting manner.

CHAPTER VI.

Orion and his Belt.

Agrahayana = *Agrayana* in the older works—Probable derivation of *hayana*—The *Agrayana* sacrifices—Their number and nature—Performed every half-year in *Vasanta* and *Sharad*—Greek legends of Orion—Their similarity to Vedic legends—German traditions and festivities—Stag and hind—Twelve nights—Dog-days—All of which indicate the commencement of the year in Orion—Dr. Kuhn's explanation is insufficient—The usual adjuncts of Orion—His belt, staff and lion's skin—The *ai-yaonghana* of Haoma in the Avesta—The *yajnopavita* of the Brahmans—Their sacred character probably borrowed from the belt of Orion or *Yajna*—Use of *mekhala*, *ajina* and *danda* in the *Upanayana* ceremony—Probably in imitation of the costume of Orion or *Prajapati*, the first of the Brahmans—Derivation of Orion from *Agrayana*—Its probability—Phonetic difficulties—Conclusion.

IN the last chapter I have quoted an observation of Plutarch that the Greeks gave their own name to the constellation of Orion, and have there discussed some Vedic legends which corroborate Plutarch's remarks and indicate that the vernal equinox was in Orion at that time. In the present chapter I mean to examine other legends which go to shew that the constellation of Orion was known and figured before the Greeks, the Parsis, and the Indians separated from their common home, and that the legends or the traditions so preserved, and perhaps the name of the constellation, can be naturally and easily explained only on the supposition that the vernal equinox was then near the asterism of *Mrigashiras*.

I have already shown that *Agrahayani*, if not *Agrahayana*, can be traced back to Panini's time, as the name of a *Nakshatra*, and that it is a mistake to derive it from the name of the full-moon day. We have now to see if we can

trace back the word still further. The word *hayana* does not occur in the Rigveda, and it may be doubted if the name *Agrahayani* was in use in the old Vedic days. *Hayana* is, however, used in the Atharva Veda (iii. 2. 21; xi. 6. 17) and in the Brahmanas; and may be compared with Zend *Zayano* meaning winter. Panini (viii.1.148) derives *hayana* from *ha* = to go or abandon, after the analogy of *gayana* and gives two meanings, viz., the grain '*vrihi*' and 'time.' Whether we accept this derivation or not, it is at any rate clear that the word was used in Panini's days, to denote a division of time and a kind of grain, and I think we can better account for both these meanings of *hayana* by connecting the word with *ayana* and *Agrayana* or the half-yearly sacrifices. Dr. Geiger, speaking of the old Parsi calendar observes that "probably the half-year was more employed in civil life than the complete year."* Now whether the observation be entirely correct or not, we can, I think at any rate, assume that the division of the year into two equal halves is an old one. I have already discussed the two-fold division of the year into *Devayana* and *Pitriyana* and its coincidence with the passage of the sun to the north and the south of the equator. *Ayana* in the sense of such a division thus appears to be an old word and by prefixing *h* to it we may easily get *hayana* subsequently changed into *hāyana* like the words in the Prajnādi list, wherein this word was not included as it was derived by Panini in a different way. The insertion and omission of *h* when

*Dr. Geiger's *Civ. East Iran.*, Vol. I., p. 152. Dr. Schrader makes a similar observation. "For all these reasons (most of which are philological) I believe we have the right to presuppose an original division of the Indo-Germanic year into two seasons." *Preh. Ant. Ary. Peoples*, Part IV., chap. vi., p. 302.

followed by a vowel at the beginning of a word is not uncommon even in these days,* and there is nothing extraordinary if we derive *hayana* from *ayana*. Now by a natural process when we have two forms of a word or two derivatives of the same root they gradually come to be utilised for specific purposes, and so acquire distinct meanings. Sanskrit lexicographers class such words under *Yogarudha*, meaning thereby that etymology and convention have each a share in determining their denotation. *Hayana* might thus come to exclusively denote a complete year, while *ayana* continued to denote a half-year as before.† When *ayana* thus became *hayana*, *Agrayana*, which all lexicologists derive from *Agra* + *hayana*,‡ would be changed into *Agra* + *hayana* = *Agrahayana*; and when *hayana* was changed to *hāyana* in a manner analogous to the words in the *Prājñadi* list (Pan. v. 4. 38) as stated above, *Agrahayana* would be altered into *Agrahāyana*. We can thus account for the double forms—*hayana* and *hāyana*, *Agrahayana* and *Agrahāyana*—which we find given in Bohtlingk and Roth's and other lexicons, while if we ac-

* Cf. The derivation of the word 'history' from 'istory' in Max Muller's *Lectures on the Science of Language*, Vol.II.p.329.

† Zend *Zayano*, denoting winter, probably preserves an older meaning, when *hayana* was used to denote the second of the two seasons (summer and winter) into which Dr. Schrader believes that the year was primevally divided. Some of the synonyms for the year in Sanskrit originally denoted particular seasons, e. g., *Varsha*, *Sharad*. *Sama* and *Hayana* may be similarly supposed to have been derived from the names of the half-year or *ayana*.

‡ This derivation would give us *Agrāyana* instead of *Agrayana* and native grammarians obtain the second form from the first by the interchange of the initial vowel with the following long *A*.

cept Panini's derivation, *hayana* will have to be either thrown out as incorrect or derived otherwise. In *Amara*, ii. 8. 52, *hayana* occurs as a different reading for *dayana*, in the sense of a vehicle and Bhanu Dikshita derives it from *hay* to go; but we might as well ask if *hay*, *ay*, and *i*, all meaning to go, are not the different forms of the same root. As far as the form of the word is concerned we may therefore derive *hayana* from *hāyana* and the latter again from *ayana* and similarly *Agrahayana* from *Agrahayana* and this again from *Agrayana*.

I may, however, remark that the process which appears so simple according to the modern philological rules, was not recognized by the native grammarians. There are good many words in Sanskrit which can be thus easily derived on the principle of the insertion and omission of *h*. Thus we have *invaka* and *hinvaka* both meaning the stars on the top of Mrigashiras, and *atta* and *hatta* denoting a market-place. But native grammarians, including Panini, would not derive the words from each other, as we have done above in the case of *ayana* and *hayana*. Their method is to give two different roots for the two words; thus we have two Vedic roots *hinva* and *inva* or *hiv* and *iv*, both meaning to go, to please, the one giving us *hinvaka* and the other *invaka*. *At* and *hat*, *an* and *han*, *ay* and *hay* *i* and *hi* are further instances of the principle adopted by the native grammarians in such cases. Really speaking this is not solving the difficulty, but only shifting it a stage backwards; for, if any explanation is necessary to account for the double forms like *ayana* and *hayana* it is equally required to explain why we should have the double roots like *ay* and *hay*, both meaning to go. But it appears that the native grammarians, having traced the words to their

roots, did not push the matter further. With them *ina* is derived from *i* to go, *ayana* from *ay* to go, *hayana* from *hay* to go, and *hāyana* from *ha* to go.* Whether and how far we can dispense with some of these roots is an important philological question, but it is not necessary for us to discuss it here. It does not much affect the point under discussion whether *hayana* is derived from *ayana* i.e., *ay* to go, or from *ha* to go as Panini has done. Etymologically both the words, *ayana* and *hayana*, mean "going" and when both came to be used to denote a division of time, it is natural to suppose that they soon acquired special meanings. Thus while *ayana* continued to denote the half-year; *hayana*, which was comparatively a later word, might have been exclusively used to denote the complete year, and as the beginning of the first *ayana* was also the beginning of the year, *Ā(a)grayana* would be naturally changed into *Ā(a)grahā(a)yana* to express the beginning of the year. Whether we adopt Panini's derivation or the principle of modern philology we thus arrive at the same result, and so far as our present inquiry is concerned we can therefore suppose that the various words, which may be represented by *Ā(a)gra(ā)yana*, or *Ā(a)grahā(a)yana*, are all transformations or derivations of *agra + ayana* || *Ā(a)grayana*.

*This method sometimes fails, and native grammarians who are not now at liberty to coin new roots, have to resort to the Prishodaradi list. For example, we have two forms *ilvala* and *hīlvala* as different readings for *invāla* in Amara i. 3. 23. Of these *ilvala* can be derived from *il*, to sleep, though the root meaning is not suitable, but *hīlvala* cannot be even so derived and Taranatha in his Vachaspatya would derive or rather obtain the initial *h* by Prishodaradi. Similarly cf. *Hintala* = *tala* + Prishodaradi !

Now as regards the meaning it appears to me that *ayana* at first denoted nothing more than the passage of the sun. Gradually it meant a division of time regulated by such passage. The *Agrayana-ishtis* thus appear to have originally meant the two half-yearly sacrifices performed on the first day of each *ayana*, which seems to be regarded somewhat like the new year's day at present, Gargya Narayana, in his commentary on Ashvalayana's *Shranta Sutra*s (i.2.9.1) derives *Agrayana* from *agra* + *ayana*; but interprets it to mean a sacrifice which is followed by eating (*ayana*), that is, which requires to be performed before the new harvest is used for domestic purposes. He thus takes *ayana* to mean eating, and as the *Agrayaneshtis* in later works like *Manu* (iv. 27) were described as "new-harvest sacrifices," all commentators have adopted this explanation of the word. But it appears to me to be evidently of later origin and invented to account for the nature of the sacrifice when owing to the falling back of seasons the *Agrayaneshtis* came to be performed not at the beginning of each *ayana* as they should have been, but at wrong times. The necessity of such an explanation must have been still more keenly felt, when instead of two half-yearly sacrifices, the *Agrayanaishtis* were performed thrice a year. Ashvalayana, it is true, gives only two, one in *Vasanta* and the other in *Sharad*, the old beginnings of the *Devayana* and the *Pitriyana* and the real commencement of the two *ayanas*. But he has mentioned three kinds of grain that may be used, *vrihi*, *shyamaka* and *yava* (i. 2. 9. 1.) and his commentator Gargya Narayana observes that *yava* and *shyamaka* are to be used simultaneously in *Sharad* (i. 2. 9. 13). It appears however, that the fact, that three kinds of grain were sanctioned for use, soon gave rise to three

Agrayana-ishtis—one in Vasanta with *vrihi*; the second in Varsha with *shyamaka*, and the third in Sharad with *yauti*. But that it is a practice of later origin is evident from a passage in the Taittiriya Sanhita (v. 1. 7. 3) which states that "twice is grain cooked for the year," clearly meaning thereby that there were only *two Agrayana-ishtis* in a year when the new harvest was first offered to gods. I am therefore of opinion that originally there were only *two* half-yearly sacrifices at the commencement of each *ayana*, and as *vrihi* was used on the occasion of the first of these *ishtis*, the word *ayana* or *hayana* naturally came to denote the grain so used, and that *ayana* in *Agrayana* originally meant not eating as the later writers have imagined, but a half-year as the word usually denotes. This way of deriving and explaining the word is not a new invention. For notwithstanding the fact that *Agrayana* and *Agrahayana* are explained by Taranatha as referring to the sacrifice of grain and eating, yet he derives *Agrayana*, a word of the same group, from *agra*+*ayana* and explains it to mean that "the Uttarayana was in its front."* Even native scholars thus appear to be aware of the fact that *Agrayana* could be or was derived from *ayana* meaning the Uttarayana. Indeed, we cannot otherwise account why the *Agrayana-ishtis* were originally celebrated at the beginning of Vasanta and the end of Varsha as stated by Ashvalayana. The *Agrahayani* of Amara is thus traceable to *Agrayani* of the Vedic works; and perhaps it was the initial long vowel in the latter that might have been retained in the later form.

It may, however, be asked if there is any evidence to show

* See Vachaspathya s. v. *Agrayana*.

that *Agrayana* was used to denote a star in the Vedic works. That Amara, and long before him Panini, understood *Agrahayani*, if not *Agrahayana*, to mean the Nakshatra of Mrigashiras is undoubted; and I think we might fairly infer therefrom that the meaning given by these writers must have come down to them traditionally. Every *ayana* must begin with some Nakshatra, and it is quite natural to suppose that *Agrayana* must have gradually come to denote the star that rose with the first *ayana*. But I have not been able to find out a passage where *Agrayana* is used in the Vedic works to expressly denote the constellation of Mrigashiras. I may, however, refer to the Taittiriya Sanhita (vi. 4. 11. 1) wherein the vessels (*grahas*) used for sacrificial purposes are mentioned as beginning with *Agrayana* and considering the fact that two other vessels are named, as the words themselves denote, after the planets Shukra and Manthin,* we might suppose that *Agrayana* came to be included in the list, not as the name of a deity, for it was not such a name, but as denoting, the star which commenced the year, or the half-year. The word *graha* which in the sacrificial literature denotes vessel has been used in later astronomical works to denote the planets, the number of which, including the sun and the moon, is fixed at nine, the same as the number of the vessels used for sacrificial purposes. It is not, therefore, improbable that *Agrahayani* or *Agrahayana* of the later writers was a transformation of *Agrayana*, and that Mrigashiras, was so called in old times for sacrificial purposes. When the *Agra-*

* See *infra* Chap. VII. In Taitt. San. iii. 1. 6. 3 the vessel is described as the vessel of *Agrayana*, thus shewing that the vessel was named after *Agrayana*, which must therefore be either the name of a deity or of a Nakshatra.

yaneśtis lost their primary meaning, *Agrayana* or *Agrahayana* naturally came to be used more to denote the month when the sacrifice was performed than the *Nakshatra* at the beginning of the *ayana*, thus giving rise to the speculations previously discussed. But in whatever way we may explain the disappearance of *Agrayana* in the sense of *Mrigashiras* in the oldest Vedic works, the fact that in the days of Amara and long before him of Panini *Agrahayani* was used to denote the constellation of Orion remains unshaken, and we may safely infer therefrom that the meaning given by them was a traditional one.

We have already seen how legends gathered round the "antelope's head." It was the head of *Prajapati* wishing to violate his daughter, by which some understood the dawn, some the sky and some the star *Aldebaran* (*Ait. Br.* iii. 33). Others built the story of *Namuchi* upon the same which placed *Vritra*, at the doors of hell; while a third class of legend-makers considered that the death of *Prajapati* was voluntary for the sacrificial purposes of the *Devas*. The following summary of the classical traditions about the death of Orion, taken from Dr. Smith's smaller *Classical Dictionary*, will show how strikingly similar they are to the old Vedic legends.

"The cause of Orion's death is related variously, "According to some, Orion was carried off by *Eos* (*Aurora*), "who had fallen in love with him; but as this was displeasing to the gods, *Artemis* killed him with an arrow "in *Ortygia*.* According to others, he was beloved by "Artemis and *Apollo* † indignant at his sister's affection

* *Homer Od.* v. 121. 4. See Gladstone's *Time and Place of Homer*, p. 214.

† *Ov. Fast* v. 537.

"for him, asserted that she was unable to hit with her arrow a distant point which he shewed her in the sea. She thereupon took aim, the arrow hit its mark, but the mark was the head of Orion, who was swimming in the sea. A third account, which Horace follows, states that he offered violence to Artemis, and was killed by the goddess with one of her arrows."

Thus love, arrow and decapitation which are the three principal elements in the Vedic legends, are all present in these traditions. There is another story which says that Orion was stung to death by a scorpion; but this is evidently intended to represent the fact that the constellation of Orion sets when that of Scorpion rises in the east, and is therefore of later origin when the zodiacal signs were adopted by the Greeks.

There are other traditions which point out the position of Orion in the course of the year. The cosmical setting of the constellation was believed to be an indication of stormy weather and the constellation was called *imbrifer* or *acquosus* in the same way as the *Shva* in the Vedas is said to commence the year, while *Shunasirau* are invoked along with *Parjanya* for rain. The German traditions are, however, more specific, and I take the following abstract of the same by Prof. Kuhn communicated to the late Dr. Rajendralal Mitra and published by the latter in his "Indo-Aryans," Vol. II, pp. 300-302—

"Both in our ancient and modern popular traditions, there is universally spoken of the Wild Hunter, who sometimes appears under the name of Wodan or Goden, and was, in heathenish times, the supreme god of the ancient German nations. This god coincides, both in character and shape with the ancient Rudra of the Vedas (*vide* p. 99).

Now there is a class of traditions in which this ancient god is said to hunt a stag and shoot at it, just as Rudra in the *Brahmanas* is represented as shooting at the *rishya* and *rohit*. The stag in German mythology, is the animal of the god Freyr, who like Prajapati, is a god of the sun, of fertility, &c., so that the shot at that stag is to be compared with Rudra's shooting at the *rishya* = Prajapati. I have further endeavoured to show that some indications exist in the mediæval penitentials of Germany and England, which give us to understand that at the close of the old year and at the beginning of the new one (we call that time "*die-zwölften*" or *the twelve days*, the *dvadashaha* of the Indians) there were mummeries performed by the country people, in which two persons seem to have been the principal performers, the one of whom was disguised as a stag while the other was disguised as a hind. Both represented a scene, which must have greatly interested and amused the people, but very much offended the clergy, by its sordid and hideous character; and from all the indications which are given in the text, communicated by me (pp. 108-180), we may safely suppose that the chief contents of this representation was the connection of a stag and a hind (or of an old woman), which was accompanied by the singing of unchaste songs. From English customs at the New-Year's Day, we may also infer that the hunter's shooting at this pair was even a few centuries ago, nay, is even now, not quite forgotten. Now as the time of the "twelve days" was with our ancestors the holiest of the whole year, and the gods were believed to descend at that time from heaven, and to visit the abodes of men, we may firmly believe that this representation also was a scene of the life of the gods. I hope to have thus proved that the Brahmanical and the German

traditions are almost fully equal, and I have finally attempted to lay open the idea from which the ancient myth proceeded. According to my explanations, our common Indo-European ancestors believed that the sun and the day-light (which was, so to say, personified under the image of various animals, as a cow or bull, a horse, a boar, a stag), was every day killed in the evening and yet re-appeared almost unhurt, the next morning. Yet a decay of his power was clearly visible in the time from midsummer to midwinter, in which latter time, in the more northern regions, he almost wholly disappears, and in northern Germany, during the time of the twelve days, is seldom to be seen, the heavens being then usually covered all over with clouds. I have therefore supposed, it was formerly believed that the sun was then completely destroyed by a god, who was both a god of night and winter as also of storm, Rudra = Wodan. The relics of the destroyed sun, they seem to have recognised in the brightest constellations of the winter months, December and January, that is, in Orion and the surrounding stars. But when they saw that they had been deceived and the sun re-appeared the myth gained the further development of the seed of Prajapati, from the remnants of which a new Aditya as well as all bright and shining gods were produced. I have further shown that both Greek astronomy and German tradition proved to be in an intimate relation with the Brahmanical tradition; for the former shows us, in almost the same place of the celestial sphere, a gigantic hunter (Mrigavyadha, Sirius; Orion, the hunter Mrigashiras); while the latter has not yet forgotten that Saint Hubertus, the stag-killer, who is nothing but a representative of the god Wodan, who had, like Rudra, the power of healing all diseases (the *bhishaktama* of the

Vedas) and particularly possessed cures for mad dogs which not only were his favourite companions, but were also in near connection with the hottest season of the year, when the declining of the sun begins, the so-called *dog-days*."

Here is an equally striking coincidence between the German and the Vedic traditions. The mummeries were performed "*at the close of the old year and at the beginning of the new one,*" and the stag and the hunter had therefore something to do with it. Pro. Khun's explanation does not clear up this point satisfactorily, nor does it give any reason why the festivals were celebrated only during the *twelve days* preceding the new year. As regards the decay of the sun's power it must have been observable during the whole season and does not therefore in any way account for the selection of 12 particular days. As for the *dvadashaha* of the Indians, it is the period during which a person consecrates himself for a yearly sacrifice and so must naturally precede the commencement of the new year when the annual sacrifice commences, and I have previously shewn that it represents the difference between the lunar and the solar years; in other words, they were what we may now call the intercalary days added at the end of each year to keep the concurrence of the lunar and the solar measures of time. The German traditions therefore can be better accounted for, if we suppose that they are the reminiscences of a time when the stag and the hunter actually commenced the year. This also explains why the dog-days were considered so important. When Sirius or the dog-star rose with the sun at the beginning of the year, the dog-days, or rather the days when the dog was not visible, were the new-year's days, and as such they were naturally invested with an importance which they never lost. I have already

alluded to the passage in the Rigveda which states that the dog awakened the Ribhus, or the gods of the seasons, at the end of the year, and this appears to me to be the origin of what are still known as dog-days in the western countries. Owing to the precession of the equinoxes and by neglecting to maintain the correspondence of the seasons the days now fall during a period different from the one they did of old, but such differences we find in all cases where ancient rites or festivals are preserved. The feast of manes, which the Parsis and the Hindus seem to have commenced together when the summer solstice occurred in the month of Bhadrapada, now no longer coincides with the summer solstice; but for that reason we cannot say that it might not have occurred originally at the summer solstice, especially when the latter supposition is supported by other reliable evidence, and gives a better origin of the festival. I am not therefore disposed to accept Prof. Khun's explanation as satisfactory, and am of opinion that the German traditions are the reminiscences of a time when the vernal equinox was in Orion, the hunter. We cannot otherwise account why the mummeries and festivals should have been celebrated during the *twelve* days at the *end* of the old and the *beginning* of the new year.

It will, I think, be evident from this that the Greeks and Germans have preserved the memory of the days when the year commenced with the vernal equinox in Orion. I have previously shown that the Parsi primitive calendar, as fixed by Dr. Geiger, points to the same conclusion. The Parsis, the Greeks, the Germans and the Indians therefore appear to have separated after these traditions were formed and after Orion was figured, and recognised as the *Agrayana* constellation. I do not think that any more traditional

coincidences are necessary to establish the Aryan origin of the constellation of Orion, as well as its position at the vernal equinox in old days. I shall, however, give one more coincidence which on account of its peculiar nature is alike interesting and important.

In the Greek mythology Orion, after his death as above described was placed among stars, where he appears as a giant with a girdle, sword, a lion's skin, and a club.* Now, if as remarked by Plutarch, Orion is an original Greek name, we should find some traces of these various adjuncts of Orion or at least some of them in the old Iranian and Indian works. Do we so find them? I think we do, only if we look for them with a little more attention and care, for the transformation is more specific and peculiarly out of the way in this case. In the Vedic works Soma is said to be the presiding deity of the asterism of Mrigashiras. Soma is Haoma with the Parsis. The 26th verse in the Haoma Yasht is as follows —

*Fra te Mazdao barat paurvanim aivyaonghanem
sther-paesanghem mainyu-tastem vanghuhim daenam
Mazdayasnim.*

which has been thus rendered by Mr. Mills in his translation of the Zend Avesta, Part III., in the Sacred Books of the East Series (p. 238) — "Forth has Mazda borne to thee, the star-bespangled girdle, the spirit-made, the ancient one, the Mazda-Yasnian Faith." Dr. Haug takes *paurvanim* in the original to mean "leading the *Paurvas*," which latter he believes to be the Persian name for the Pleiades, which is variously written *paru*, *parvah*, *parvin* and *parviz*.† This keen-sighted suggestion of Dr. Haug has been pronounced

* See Smith's *Dictionary of Classical Mythology*.

† Dr. Haug's *Essays on the Parsis*, p. 182.

conveys the same meaning as *mainyu-tastem*. The coincidence between these verses cannot be accidental, and it appears to me that the sacred thread must be derived from the belt of Orion. *Upavita*, from *ve* to weave, literally means a piece of cloth and not a thread.† It appears, therefore, that a cloth worn round the waist was the primitive form of *yajnopavita* and that the idea of sacredness was introduced by the theory that it was to be a symbolic representation of Prajapati's waist-cloth or belt. In the *Taittiriya Sanhita* (ii.5.11.1) *nivita*, *Prachinavita*, and *upavita*, three words which at present denote the position of the sacred thread on the body of a Brahman, are defined, but the *Mimamsakas*‡ understand them to apply not to the sacred thread, as we now wear it, but to a piece of cloth or deer-skin, which everyone must use at the time of sacrificing. It appears, therefore, that in the oldest times the Brahmans wore a piece of cloth or deer-skin and not a thread. This conclusion is further strengthened by the fact, that according to the ritual given in the *Sutras*, no sacred thread is mentioned in the description of the ceremony of *Upanayana*;§ while the investiture with the

* सहजं स्वभावभूतं अथवा देहेन्द्रियादिभिः सहोत्पन्नम् । Shankarananda's com. on *Brahmopanishad* (MS.).

† Cf. *Medhatithi* on *Manu*, ii. 44.

‡ Cf. *Jaiminiya-nyaya-mala-vistara*, iii.4.1. अथ प्रसीधमानं निवी-
तादिकं वासोविषयं न निवृत्तव्यविषयं । “अजिनं वासो वा इक्षिपतः उपवीत”
(*Taitt. Arn.* ii.1) इत्यनेन सहस्रत्वात् । वस्त्रस्य च निवीतं सौकर्याच्च
प्राप्तम् । *Taitt. Arn.*, ii. 1 is the only passage in the Vedic works
which fully describes the positions *निवीतं* &c., and it expressly
mentions *वास* and *अजिन*, but not *सूत्र*.

§ See *Taranatha's Vachaspathya s.v. upavita*. Also *Ashvalayana Grihya Sutra* i. 19, 8-10-12, where *ajina*, *mekhala*, and *danda* are alone mentioned.

thread is looked upon at present as the principal part of that ceremony. We have still retained a memory of this old practice in the performance of obsequies and at the time of performing sacrifices, when a piece of cloth is worn in addition to the sacred thread. Devela* says that out of the three sacred threads to be worn, one is a substitute for the upper garment, thus clearly indicating what the old practice was. But this is not the place to go into these details. It is enough for our purpose to notice that *yajnopavita* originally, meant a piece of cloth, and that in the times of the *smṛiti*-writers, it came to be symbolically represented by the sacred thread, thrice twisted and thrice folded. There is, however, another difficulty which must be here noticed. The Parsis wear their sacred thread round the waist, while the Brahmans usually wear it over the left shoulder and across the body, leaving the right arm free (*i. e.*, *upavita*). The Parsis may thus be said to wear their sacred thread after the manner of Orion; but in the case of the Brahmans, it may be questioned if their manner of wearing the thread corresponds to the position of Orion's belt. From the passage in the Taittiriya Saṁhita referred to above, it will, however, be seen that *nivita* (and not *upavita*), is the position of the thread there prescribed for all human actions, or, in other words, for doing all ordinary business of life. *Nivita* has been defined by all later writers to mean the position of the sacred thread passing around the neck, over both the shoulders and dropping down in front. A reference to Kumārila Bhaṭṭa's *Tantra Vartika* (iii.4.2), will, however, show that *nivita* also meant "tying round the waist," and Kumārila observes that "tying round the waist is the most convenient position for all kinds of work."* Anandagiri

* हस्तिकुल्लरीवार्थे वस्त्राभावे तद्विषयते ।

and Govindananda in their commentaries on the Shankara's Bhashya on the Brahmasutras (iii. 4. 19), give the same explanation, from which it appears that the Brahmans, like the Parsis, once wore the thread around the waist, thus literally *girding* up their *loins* when they had to do any work. The sacred thread of the Parsis and the Brahmans thus seems to be a symbolical representation of Prajapati's girdle or Orion's belt in every respect. The various stages, by which the original piece of cloth round the waist dwindled into a thread, are interesting and instructive from a ceremonial point of view, but not being relevant to the present inquiry, I do not mention them here.

* As the passage is important as a record of now obsolete practice I give it here in the original—

निर्वर्ति केचिद्गलवेणिकाबंधं स्मरति । केचित्पुनः परिकरबंधं ।
तत्र गलवेणिकाबंधो बुद्धादन्यत्र न प्राप्नोति । परिकरबंधस्तु
सर्वकर्मस्वयम्भृताकरत्वात्प्राप्त इति ।

The word स्मरति in this passage indicates that the writer had a स्मृति text in his mind. Madhava in his commentary on the Parashara Smriti (Cal. Ed., p. 450) quotes Katyayana and Devala as follows—

कात्वायनः—पृष्ठवंशे च नाभ्यां च बद्धुं विदते कटिम् ।

बुद्धार्थमुपश्रितं स्वात्मतिलं च चोद्धृतम् ॥

देवलः—स्तनादूर्ध्वमधो नाभेः नैव धार्यं कदाचन ।

I think these verses clearly indicate that the thread must be worn below the breast and above the navel, and going round the whole waist. As the practice has long since been obsolete, the verses have been much misunderstood by later writers. The author of स्मृत्यर्थसार does, however, clearly state that there are two ways of wearing the thread, first over the shoulder as described in the Taitt. Arn. ii. 1; and (बद्धा in the original) second as given in the above texts of Katyayana and Devala. This view has also been adopted by the author of the संस्कारकोशम्.

But the sacred thread is not the only trace of Orion's dress that we have retained. A reference to the Upanayana ceremonial will show that we have preserved belt, staff, skin, and all. Every boy, who is the subject of this ceremony, has to wear a *mekhala* or grass cord round his waist, and we still put three knots to his cord just over the navel, as it were, to represent the three stars in the belt of Orion.* In the Vajasaneyi Sanhita 4. 10, we are told that the knot of the *mekhala*, when it is worn for sacrificial purposes, is to be tied with the mantra, "you are the knot of Soma;"† which Mahidhara explains as "a knot dear to Soma;" but which remembering that we have a similar verse in the Haoma Yasht, may be naturally interpreted to mean the knot of Soma, the presiding deity over the constellation of Orion. Then every boy whose *upanayana*, or the thread-ceremony as it is popularly understood, is performed, must carry with him a stick of the *palasha* or the fig-tree and the same passage in the Vajasaneyi Sanhita says that for sacrificial purposes the stick (*danda*) is to be taken in hand by the Mantra, "O wood! be erect and protect me from sin till the end of this *yajna*." Here again Mahidhara interprets *yajna* to mean sacrifice for which the staff is taken up.

* In the Prayoga works we have (and we still do so) :—

मैललां निरावर्यं नाभिप्रदेशे मथिष्यन् कुर्यात् ।

In the Sankhyayana Grihya Sutra ii. 2. 2, we are told that the knots of the *mekhala* may be one, three or five, and the commentator adds that the knots should be equal in number to one's *pravaras*. The author of the Sanskara Kaustubha quotes a *smṛiti* to the same effect. But the explanation is unsuited to the first case, *viz.*, of one knot, and I am inclined to take it to be a later suggestion.

† सोमस्य कीनिरसि ।

But I think here also we may trace a reference to Prajapati *alias* Yajna. The third accompaniment of a newly initiated boy is the deer-skin. Theoretically it is necessary that he should be fully clothed in a deer-skin, but practically we now attach a small piece of deer-skin to a silk-thread and wear this thread along with the *yajnopavita*, *Mekhala*, *ajina*, and *danda* (the girdle, the skin and the staff) are thus the three distinguishing marks of a newly initiated boy; and what could they mean, except that the boy is made to assume the dress of Prajapati as far as possible. To become a Brahman is to imitate Prajapati, the first of the Brahmins. Prajapati assumed the form of a deer, so the boy is clothed in a deer-skin; Prajapati has a girdle round his waist (the belt of Orion), so has the boy his *mekhala* with three knots over the navel; and lastly, Prajapati has a staff, and so the boy must have it too.*

* Dr. Schrader in his *Preh. Ant. Ary. Peop.*, Part iv., Chap. viii., concludes that the primitive dress consisted of a piece of woolen or linen cloth thrown round the shoulders like a mantle, and a girdle. The history of *yajnopavita*, the way of wearing it as described in Taitt. Arn. ii. 1, and Orion's dress, as conceived by the Greeks, point to the same conclusion. I have already alluded to the difficulty of explaining how *upavita*, which literally means a cloth, came to denote a thread. If *yajnopavita* be taken to have originally meant *yajna* and *upavita*, and *yajna* be further supposed to have once denoted a girdle this difficulty is removed. Av. *yasto* Gk. *zostos*, Lith. *justas*, meaning "girded" point to an original root *jos*, Av. *yangh*, from which Gk. *zonu*, Av. *aiv-~~g~~onghana* may be derived (See Ficks' Indo-Germ. Wort.). If we suppose that the root appeared as *yaj* in Sanskrit and derive *yajna* from it, like Gk. *zonu*, we may take *yajna* to mean a girdle and translate भवज्ञोपवीती कथं ज्ञास्यः (Jabal. Up. 5) by "how can a Brahman be without a girdle and a cloth?" If this suggestion be correct, then *yajnopavita* must be

Thus in their Upanayan ceremony the Brahmans have fully preserved the original characteristic of the dress of Prajapati or Orion. The Brahman *batu* (boy) does not, however, carry a sword as Orion is supposed to do, and the skin used by the boy is deer's and not lion's. I cannot account for the first of these differences except on the ground that it might be a later addition to the equipment of Orion, the hunter. But the second might be traced to a mistake similar to that committed in the case of the seven *rikshas*. The word *Mriga* in the Rigveda, means according to Sayana both a lion and a deer, and I have already referred to the doubts entertained by modern scholars as to the animal really denoted by it. *Mrigajina* is therefore likely to be mistaken for lion's skin. There is thus an almost complete coincidence of form between Orion as figured by the Greeks and the boy whose *upanayana* is recently performed, and who is thus made to dress after the manner of Prajapati. I do not mean to say that a piece of cloth was not worn round the waist before the constellation of Orion was so conceived; on the contrary, it is more natural to suppose that the ancient

taken to have meant nothing more than a mantle and a girdle in primitive times and that the primitive people invested Orion with a dress similar to their own. When Orion came to be looked upon as a celestial representation of Prajapati, Orion's dress must have attained the sacred character which we find preserved in the sacred thread of the Parsis and the Brahmans. I, however, know of no passage in the Vedic literature where *yajna* is used in the sense of a girdle, and hence the above suggestion must be considered as very doubtful. But it may be here mentioned that in Marathi we use the word *janne* to denote the sacred thread. This word is evidently derived from Sk. *yajna*, Prakrita *janno*. Perhaps we have retained only the first word of the long compound *yajnopavita*

people invested Orion with their own dress. But the coincidence of details above given does, in my opinion, fully establish the fact that the sacred character of a *batu's* dress was derived from what the ancient priests conceived to be the dress of Prajapati. With these coincidences of details, still preserved, it is impossible to deny that the configuration of the constellation of Orion, is of Aryan origin and that the Hellenic, the Iranian and the Indian Aryas must have lived together when these traditions and legends were formed.

And now it may be asked that if the Eastern and the Western legends and traditions of Orion are so strikingly similar, if not identical, if the dress and the form of the constellation are shewn to have been the same amongst the different sections of the Aryan race, and if the constellations at the feet and in front of Orion—Canis Major and Canis Minor, Kuon and Prokuon,* Shvan and Prashvan, the Dog and the Foredog—are Aryan both in name and traditions; in short, if the figure, the costume, the attendants and the history of Orion are already recognised as Aryan, is it not highly probable that the name, Orion, should itself be a transformation or corruption of an ancient Aryan word? Orion is an old Greek name. Homer in the fifth book of *Odyssey* speaks of the bold Orion and the traditional coincidences, mentioned above, fully establish the probability of Plutarch's statement that the word is not borrowed from a non-Aryan source. Two of the three names, mentioned by Plutarch, Canis (*Kuon*) and Ursa (*Arktos*) have again been phonetically identified with Sanskrit *shvan* and *rikshas*, and we may, therefore, legitimately expect to find Orion similarly traced back to an Aryan original. The task, how-

* See note on page 119 *supra*.

ever, is not so easy as it appears to be at the first sight. The Greek mythology does not give us any help in the solution of this question. It tells us that a hunter by name Orion was transformed after his death into this constellation which consequently came to be called after him. But this is surely no satisfactory explanation. Who is the hunter that was so transformed? There are many mythological proper names in Greek which can be traced back to their Aryan originals, and why should Orion be not similarly derived? The story obviously points to the Vedic legends of Rudra, who is said to be still chasing Prajapati in the heavens. The Vedic legend has fully preserved all the three elements in the story—the hunter Rudra, the dog and the antelope's head, while the Greeks appear to have retained only the hunter and the dog with nothing to hunt! But that does not, preclude us from discovering the identity of these legends, and the question is whether we can suggest a Sanskrit word which will give us Orion according to the already established phonetic rules. I know of no name of Rudra from which *Orion* can be so derived. But if we look to the names of the constellation of Mrigashiras, we may, I think, in the absence of any better suggestion, provisionally derive *Orion* from Sanskrit *Agrayana* the original of *Agrahayana*. The initial long *a* in Sanskrit may be represented by omega in Greek as in Sk. *ama*, Gk. *omos*, Sk. *ashu*, Gr. *okus*, and the last word *ayana* may become *ion* in Greek. It is not, however, so easy to account for the dropping of *g* before *r* in the body of the word. Comparison of Sk. *gravan* with Gk. *laos* and of Sk. *ghrana* with Gk. *ris*, *rinos*, shews that the change may take place *initially*, but scholars whom I have consulted think that there is no instance in which it takes place *medially*

between Greek and Sanskrit, though such changes are not rare between other languages as in Old Irish *ar*, Cymric *aer*, which K. Brugmann derives from* *agra*. Also compare Gk. *dakru*, Goth. *tagr*, Old Irish *der*, English *tear*; Latin *exagmen*, *examen*, O. Ir. *am*, from the root *aj*. I do not feel myself competent to decide the question, and hence must remain content with simply throwing out the suggestion for what it is worth. I have shewn that traditional coincidences clearly establish the possibility of the Aryan origin of Orion, and if I have not hit upon the correct word that does not affect my argument. My case does not, in fact, rest on phonetic coincidences. I rely principally upon certain statements in the Vedic works, which indicate that the vernal equinox was once in Orion, and I wanted to shew—and I think I have shewn it—that there is sufficient evidence in the Greek and Parsi legends to corroborate the statement in the Vedic works about the Phalguni-full-moon being once the first night of the year. We can now give a reasonable explanation of how Fravarshinam came to be the first month in the primitive Parsi calendar and why Dathusho should have been dedicated to Din (creator).†

* Comp. Gram. Vol. I Arts. 518. 523. Prof. Max Muller extends the rule to Greek and Latin, see his Lectures on the Science of Language, Vol. II., p. 309, where several other instances are given. For a full statement of the phonetic difficulties in identifying Gk. *Orion* with Sk. *Agrayana*, see App. to this essay.

† By the bye it may be here remarked that we can perhaps better account for the names Ahuramazda and Ahriman on the theory that the vernal equinox was then in Orion, the winter solstice in Uttara Bhadrpada and the summer solstice in Uttara Phalguni. The presiding deities of the last two Nakshatras are respectively Ahir-Budhnya and Aryaman. According to the Avesta belief, which assigns the south to the gods and the north to the Daevas, Ahir-Budhnya, as the regent of the southernmost

The mummeries and festivals amongst the Germans can also be more satisfactorily accounted for, while above all, the form, the dress and the traditions of Orion may be now better traced and understood. I have already in the previous chapter shown that even the Vedic legends, especially those in the later works, can be simply and naturally explained on the assumption we have made regarding the position of the equinoxes in the days of the Rigveda. The hypothesis on which so many facts, legends, and traditions can be so naturally explained, may, in the absence of a better theory, be fairly accepted as correct without more proof. But in the present case we can go still further and adduce even direct evidence, or *express* Vedic texts, in its

point, would come to be regarded as the supreme ruler of the gods, while Aryaman would be the king of evil spirits. Therefore we may suppose that the names Ahura-Mazda and Ahriman, if not actually derived from these words, were, at least modelled after them. Amongst the names of the Vedic deities Ahir-Budhnya is the only word, both the component members of which, are declined as in Ahura-Mazda. Spent-Mainyus and Anghra-Mainyus is a distinct pair by itself; and besides the difficulty of deriving Ahriman from Anghra-Mainyus, there seems to be no reason why Ahriman, if so derived, should be contrasted with Ahura-Mazda (See Phil. Mazd. Relig. by Casartelli, trans. by F.J. Dastur Jamasp Asa, §§ 71, 72, pp. 54-6). Parsi mythology has another deity named Airyaman, and as this word is derived from Sanskrit Aryaman, it may be objected that same word cannot be said to have also given the name for the evil spirit. I do not think that the objection is well founded. Cf. Andra (Sk. Indra) and Verethraghna (Sk. Vritrahan) both of which are the names of the same deity in Sanskrit, but one of which has become an evil spirit in the Avesta. But I cannot fully discuss the subject in a note, and not being pertinent to my case, I cannot also do more than merely record here an explanation that may possibly be suggested.

support. In the chapter on the Krittikas, I have drawn attention to the remarks of Prof. Max Muller who objected to the conclusion based entirely on the Vedanga Jyotisha on the ground that no allusion to the position of the Krittikas was to be found in the Vedic hymns. We can now account for this silence; for how can the hymns, which appear to be sung when the sun was in Orion at the beginning of the year, contain any allusion to the period when the vernal equinox fell in the Krittikas? This could have been easily perceived if, instead of confining to the controversy about the position of the Krittikas and endeavouring to find out if some clue to the date of the Veda could be obtained from the determination of the original number and source of the Nakshatras, scholars had pushed their inquiries further back and examined the Vedic hymns in the same critical spirit. It would not have been difficult in that case to discover the real meaning of the Vedic verse which states that "the dog awakened the Ribhus at the end of the year." I have in a previous chapter already referred to the verses in the Rigveda regarding the position of Yama's dogs and the death of Namuchi. These passages, as well as the description of *Vrika* or the dog-star rising before the sun after crossing the eternal waters, the terminus of the Devayana (Rig. i. 105.11), sufficiently indicate the position of the equinoxes in those days. In the next chapter I propose to discuss and examine two other important passages from the Rigveda, which *directly* bear out the statement in the Taittiriya Sanhita with which we have started, viz., that the Phalguni full-moon commenced the year at the winter solstice in days previous to those of the Taittiriya Sanhita and the Brahmanas.

CHAPTER VII.

Ribhus and Vrishakapi.

Knowledge of astronomy in Vedic times—The seasons and year—The *ayanas*—The zodiacal belt or *rita*—Observation of a total eclipse of the sun in the Rigveda—Knowledge of the planets—Shukra and Manthin—Venus and Vena, Shukra and Kupris—The legend of the Ribhus—Their identification with the Ritus or the seasons of the year—Their sleep or rest in Agohya's (sun's) house for 12 intercalary days—Said to be awakened by a dog (Rig. i. 161. 13) at the end of the year—Indicates the commencement of the year with the dog-star—Nature and character of Vrishakapi—His identification with the sun at the autumnal equinox—The hymn of Vrishakapi in the Rigveda x. 86—Its meaning discussed verse by verse—Cessation and commencement of sacrifices on the appearance and disappearance of Vrishakapi in the form of a Mriga—Indrani cuts off his head and sets a dog at his ear—Orion (Mrigashiras) and Canis—meaning of *nediyas* in the Vedic literature—when Vrishakapi enters the house of Indra, his Mriga becomes invisible (Rig. x. 86. 22.)—Points to the vernal equinox in Orion or Mriga—Leading incidents in the story stated and explained.

It is said that we cannot suppose that the Vedic bards were acquainted even with the simplest motions of heavenly bodies. The statement, however, is too general and vague to be criticised and examined. If it is intended to be understood in the sense that the complex machinery of observation which the modern astronomers possess and the results which they have obtained thereby were unknown in early days, then I think there cannot be two opinions on that point. But if by it is meant that the Vedic poets were ignorant of every thing except the sun and the dawn, ignorant of the Nakshatras, ignorant of months, *ayanas*, years and so on, then there is no authority or support for

such a supposition in the Rigveda. On the contrary, we find that some of the Nakshatras are specifically named, such as *Arjuni* and *Agha* in Rig. x. 85. 13, while the same hymn speaks generally of the Nakshatras, and the motions of the moon and the sun as causing the seasons. In Rig. i. 164 we have again several references to the seasons, the year and the number of days contained in it (verse 48) and according to Yaska, perhaps to the *ayanas* (Nirukta 7. 24). I have in a previous chapter referred to the passages in the Rigveda, which mention the Devayana and the Pitriyana, the old names of the *ayanas* beginning with the vernal equinox; and there is, therefore, no objection to understand the above verse (i. 164.48) as alluding to the black or the Pitriyana. The intercalary month is mentioned in Rig. i. 25. 8, while in i. 24. 8 Varuna is said to have constructed a broad path for the sun, which appears evidently to refer to the Zodiacal belt. I am further inclined to think that the path of *rita* (Rig. i. 41. 4) which is mentioned several times in the Rigveda, where the Adityas are said to be placed (x. 85. 1), and wherein Sarama discovered the cows of Indra (v. 45. 7, 8) refers to the same broad belt of the Zodiac which the luminaries, as observed by the Vedic bards, never transgressed. It was so to speak their 'right' way, and therefore called *rita*, which though literally derived from *ri*, to go, soon came to mean the 'right' path, the *circle* of which exists for ever, or rather exists and exists (*varivarti*) in the vault of the heavens (Rig. i. 164.11). Prof. Ludwig goes further and holds that the Rigveda mentions the inclination of the ecliptic with the equator (i. 110. 2) and the axis of the earth (x. 86. 4). It is now generally admitted that the seven *rikshas* were also known and named at this time. The mention of a hundred physicians in Rig. i. 24. 9 may again be taken

to represent the asterism of *Shata-bhishak* or *Shata-taraka*, presided over by Varuna according to the later lists of the Nakshatras in the Taittiriya Brahmana. The fortieth hymn in the fifth Mandala of the Rigveda is still more important in this connection. It shows that an eclipse of the sun was then first observed with any pretensions to accuracy by the sage Atri.* It is thus that I understand the last verse in the hymn which, after describing the eclipse, says, "Atri alone knew him (the sun) none else could." This observation of the solar eclipse is noticed in the Sankhyayana (24. 3) and also in the Tandya Brahmana (iv. 5 2; 6. 14), in the former of which it is said to have occurred three days previous to the, *Vishuvan* (the autumnal equinox). The observation thus appears to have attracted considerable attention in those days. It seems to have been a total eclipse of the sun, and the stars became visible during the time, for I so interpret the expression,

* Prof. Ludwig has tried to deduce the date of the hymn from this circumstance. But the attempt is a failure as shewn by Prof. Whitney (see the Proceedings of the American Oriental Society, Vol. XIII., pp. 17-22). As the eclipses recur in the same order after a certain period, we cannot use such facts for chronological purposes without knowing the geographical position of the place where the eclipse occurred, and even then the conclusion will be correct only if it can be shown on independent grounds that such a phenomenon did not occur at that place during several centuries before or after the date we determine. I, therefore, simply use the hymn for the purpose of showing that an eclipse of the sun was observed in those days in such a way as to leave a record behind. It would be difficult to deduce any other reliable conclusion from it even upon the assumption, not known and hence not used by Prof. Ludwig, that the vernal equinox was then in Orion and that the eclipse occurred 3 days before the autumnal equinox as described in the Brahmanas. I cannot, however, accept the suggestion that the hymn may be understood as referring to the obscuration of the sun by clouds.

bhuvanani adidharyak in verse 5. In verse 6 we are told that "Atri knew (the eclipsed sun) by *turiya brahma*," and Sayana interprets the last two words to mean "the fourth verse or mantra. But the verse wherein these words occur is itself the sixth, and Sayana has to explain that by "fourth" is to be understood the "fourth, if we count from the sixth, i. e., the tenth verse! The explanation may be good from the ritualistic point of view, but it appears to me to be quite unsatisfactory otherwise. I would rather interpret *turiyena brahmana* to mean "by means of *turiya*." *Turiya* is mentioned in modern astronomical works as a name for an instrument called quadrant (Siddhanta Shiromani xi. 15), and though we may not suppose the same instrument to have existed in the old Vedic days, yet there seems to be no objection to hold that it may have meant some instrument of observation. The word *brahma* is no doubt used to denote a mantra, but it may also mean knowledge or the means of acquiring such knowledge. In Rig. ii. 2. 7 Sayana has himself interpreted *brahma* to mean some "act or action;" and I see no reason why we should not understand the phrase *turiyena brahmana* in the above hymn to mean "by the action of *turiya*" or in other words, "by means of *turiya*," and thus give to the whole hymn a simple and natural appearance, rather than endeavour to interpret it after the manner of the Red Indians, who believed that Columbus averted the calamity of the eclipse by prayers. The peasants of the Vedic times, some scholars might argue, cannot be considered to be more civilized than the Red Indians; but in so arguing they forget the fact that there must be a Columbus, who would, by his superior capacity, inspire the feelings of awe and reverence for him. When the bards, therefore, tell us that Atri knew of the eclipse by *turiya brahma*, we can now easily see what it means.

Sayana's explanation, as I have above observed, may be good from the ritualistic standpoint; but we cannot, for other purposes, accept an interpretation which makes the fourth to mean the 'tenth' verse of the hymn ! Thus understood the hymn clearly indicates that at the time when the observation was taken the Vedic priests were tolerably well acquainted with the elementary astronomical facts. It is, however, suggested that the planets were unknown in those days. I am unable to accept even this statement. It is impossible to suppose that the Vedic poets, who constantly watched and observed the various Nakshatras in the Zodiac, should not have noticed planets like Venus, Jupiter, or Saturn, which outshine many of the Nakshatras in brilliancy. The periodical appearance of Venus in the west and the east, and especially its rising only to a certain altitude followed by its regress, are facts too striking to remain unnoticed even by the superficial observers of the heavens. But we must not go on mere probabilities. The hymns of the Rigveda are before us, and though probabilities may serve the purpose of determining the direction of our search, yet if we cannot find any reference to the planets in the Vedic works themselves, we must give up the notion that they were known to the poets of these hymns. There is no question that planets were known in the days of the Brahmanas. In the Taittiriya Brahmana (iii. 1. 1. 5) we are told that Brihaspati (Jupiter) was first born* near the asterism of Tishya, and to this day the conjunction of Tishya and Jupiter is considered as highly auspicious in the astrological works. We have, however, to look for any allusion to the planets in the Rigveda

* बृहस्पतिः प्रथमे जायमानः तिस्रं नक्षत्रं प्रादुर्बभूव । This reminds us of Rig. iv. 50. 4, where similar wording occurs, thus—बृहस्पतिः प्रथमे जायमानो नक्षो ज्योतिषः परमे ज्योतिषः ।

itself. The mention of the five bulls in Rig. i. 105. 10 may not be considered as sufficiently explicit to denote the five planets; * but what shall we say to the mention of Shukra and Manthin together in Rig. iii. 32. 2 and ix. 46. 4? They seem to be evident references to vessels called Shukra and Manthin used in sacrifices and have been so interpreted by the commentators. But as I have before observed, the vessels in the sacrifice themselves appear to have derived their names from the heavenly bodies and deities known at the time. It is generally conceded that the sacrificial arrangements more or less represent the motions of the sun† and the chief events of the year. In other words, the yearly sacrifice is nothing but a symbolical representation or rather imitation of the sun's yearly course. If so, it is natural to suppose that some of the sacrificial vessels at least were named after the Nakshatras and the planets. In the Taittiriya Sanhita iii. 1. 6. 3, the vessels are spoken of as 'the vessel of Shukra,' 'the vessel of Manthin,' and so on, which indicates that Shukra and Manthin were not used as adjectives of the vessels. The only other explanation is to suppose that Shukra, Manthin, Agrayana, &c., were the names of Soma juice, and that the vessels used for holding that juice in its various capacities, were described as the vessels of Shukra, &c. There is, however, no authority in the sacrificial literature for holding that Soma really had so many and such different capacities; and I therefore conclude that the mention of Shukra and Manthin, as

* Cf. Rig. i. 162. 18; x. 55. 8. Also see Kaegi's Rigveda (translated by Arrowsmith), p. 20, and note 67 on page 115. I hold that the planets were not only known, but some of them at least had already received their names by this time.

† See Dr. Haug's Intro. Ait. Br., p. 46.

applied to vessels, in the Rigveda is a clear indication of the planets being then discovered. There is, however, in my opinion, a more explicit reference to a planet in the Rigveda which does not seem to have yet been noticed. In the tenth Mandala we have a hymn (123) dedicated to Vena which according to Yaska denotes a deity of the middle region. Yaska (Nirukta 10.38) derives the word from *ven* 'to love,' 'to desire,' and explains it as denoting, as his commentator Durgacharya says, "loved by all," * while the hymn itself contains such expressions as the "son of the sun," "on the top of *rita*," "comes out of the ocean like a wave,"† &c, which have been variously interpreted by the commentators. But from all these facts I think we have herein the original Aryan name of Venus. The word, or rather the meaning I have here proposed, is entirely lost in the Sanskrit literature, but considering the fact that the Latins named the planet as Venus, while the word cannot be satisfactorily derived from any Latin root, there can be no objection to identify Venus with the Vena (non. sin. Venas) in the Vedic works. In the Latin mythology Venus is the goddess of love, and this we can now easily account for, as the name of the Vedic deity is derived from a root which means "to desire," "to love." I may again point out that the hymn of Vena in the Rigveda, is

* See Mahidhara on Vaj. San. 7. 16. Some consider that the root is *Vin* and not *Ven*.

† This reminds one of the tradition of Aphrodite who, in Greek mythology, is said to be sprung from the foam of the sea.

‡ In Dr. White's Latin-English Dictionary the word is derived from Sanskrit *van* to love; But if it is to be derived from a Sanskrit root why not derive it from *vin* or *ven* to desire or love, and so connect it with *Vena* of the Rigveda.

used in sacrifices at the time, when the priest takes up the vessel *Shukra* is the sacrificial ceremonies.* *Katyayana*, indeed, mentions the optional use of the hymn for taking up the vessel of *Manthin*.† But that does not much alter the position, for, when the meaning of the word was utterly forgotten, the hymn might come to be used for a different purpose in addition to the previous one. The fact, that the *Vena* hymn was used in taking up the *Shukra* vessel is, therefore, an important indication of its old meaning, and when we find the name actually preserved till now indicating the planet *Venus*, and that this name cannot be satisfactorily derived in any other way, we might fairly infer that *Vena* of the *Rigveda* is *Venus* of the Latin mythology. As regards the change of gender we need not consider it to be a serious objection inasmuch as not only *Venus*, but also the moon has changed in gender in its passage to Europe. As a further proof of the statement that the planets, or at any rate *Shukra*, was discovered and named in the primitive period, I refer to the Greek word *Kupris* (Latin *Cypris*) which means *Venus*. The word can be easily identified with Sanskrit *Shukra* which, according to the well-established phonetic rules, becomes *Kupros* in Greek, the initial *sh* being changed to *k*, as in Sk. *shvan*, Gk. *kuon* and the medial *kr* to *pr* by labialisation, of Gk.

* See Durgacharya on Nirukta 10. 39. शुक्रं ग्रहोऽनया गृह्यते.

† The *Sutras* of *Katyayana* bearing on this point are as follow— (See *Kat. Shr.* Su ix. 6. 11-13) शुक्रं वेत्वेन वा तं प्रजयेति । अथ वेन इत्येके । मायिनमथ वेन इति । Thus he first lays down that the *Shukra* vessel should be taken by reciting the hymn तं प्रजया &c. (*Vaj. San.* 7. 12) or according to some the hymn अथ वेन &c. (*Vaj. San.* 7. 16. *Rig.* x. 123). He then observes that this latter hymn is used in taking up the *Manthin* vessel.

priamāi, Sk. *kri-nāmī*, I purchase. As Venus was supposed to be a feminine deity in Europe *Kupros* was naturally changed into *Kupris*. Thus, both the Latin and the Greek names of the deity may be traced back to the Vedic *Vena* and *Shukra*, and we may therefore hold that the planet was discovered and named before these races separated. I know that European lexicologists derive *Kupris* from *Kupros* the Greek name of the island of Cyprus where Venus was said to be much worshipped and that Cyprus again is supposed to have received its name from the trees, cypresses, in which it abounds! But the explanation, which gives no derivation for the name of the tree, seems to me to be quite unsatisfactory. If Aphrodite was known to the Greeks in the primitive times it is more natural to derive the name of the island from the name of the deity. In course of time this original connection between the name of the deity and that of the island may have been forgotten, and Greek writers regarded *Kupris* as born in Cyprus. But we must receive these derivations of Greek mythological proper names with great caution as most of them have been suggested at a time when comparative Philology and comparative Mythology were unknown. Latin *cuprum* meaning 'copper' is again said to be derived from Cyprus (Gk. *Kupros*), but it does not affect our argument, for whatever be the reason for giving the name to the island, once it was named Cyprus or Kupros, many other words may be derived from it without any reference to the reasons for which the island was so called.

Some of the reasons given above may be doubtful, but on the whole I am inclined to hold that the Vedic Rishis were not as ignorant of the broad astronomical facts as they are sometimes represented to be. They seem to have watched and observed the sun and the moon during

their yearly course noted the bearing of their motions on the division of time, fixed the length of the solar year and endeavoured to make the lunar correspond with it. The Nakshatras and their rising and setting also appear to have been duly observed. It was perceived that the sun and the moon and such of the planets as they had discovered never travelled out of a certain belt in the heavens, called *rita*; while the eclipses of the sun and the moon also received due attention and notice. Men, who were acquainted with these facts, would naturally be able to fix the beginning of the months and the year by the stars that rose at the time, and though we cannot suppose the Vedic bards to have been in the possession of any accurate astronomical instruments, yet it was not difficult for them to decide roughly by simple observation when the day and the night were equal, or when the sun turned to the north, either from the solstitial or from the equinoctial point. The knowledge implied by these observations may appear to be too much for a Vedic poet in the opinion of those who have formed their notions of primitive humanity from the accounts of savages in Africa or the Islands of the Pacific. But as observed before, we must give up these *a priori* notions of primitive humanity in the face of evidence supplied by the hymns of the Rigveda. It is on this evidence that we have to form our judgment of the primitive Aryan civilization, and if that evidence is found conflicting with our prepossessions, the latter must be given up. In what follows I shall therefore assume the capacity of a Vedic bard to make the simple observations above mentioned.

We shall now take up the verse in the Rigveda, referred to several times previously, the verse, which declares that a dog awakened the Ribhus at the end of the year (Rig.

i. 161. 13); and the first question that arises in this connection is, who are the Ribhus? Referring to Nirukta (11. 15 and, 16) we find that native scholars consider that the three Ribhus—Ribhu, Vibhvan and Vaja—were the sons of Sudhanvan and that having rendered wonderful services to the gods they gained divine honors and a share in the sacrifice and immortality.* But even Yaska does not seem to be satisfied with this explanation. There are several hymns in the Rigveda wherein the deeds of the Ribhus are described (Rig. iv. 33-37; i. 20. 110, 111 and 161), and in most of them the Ribhus are spoken of as working in close connection with the year (*samvatsam* or *samvatsara*). Thus in the Rigveda i. 110. 4 they are said to have commenced work at the end of the year, and in iv. 33. 4. they are described as engaged, for the whole year (*samvatsam*), in reviving the cows (the rays of the sun). The Ribhus are further mentioned as resting in the house of Agohya, the "unconcealable" sun-god for twelve days at the end of their course (Rig. iv. 33. 7). In Ait. Br. iii. 30 they are described as sun's neighbours or pupils (*antevasas*); while in Rig. iv. 51. 6 their work is said to be done by the dawn. Yaska therefore considers that the Ribhus also represented the rays of the sun, and in this he is followed by Sayana. But the explanation does not account for the number of the Ribhus who are said to be *three* brothers. We must therefore go a step further and hold that the Ribhus did not merely represent the rays of the sun generally, but the *three* seasons, as connected with them, as several European scholars have suggested.† In the Rigveda iv. 34. 2, the

* Also compare Brihad-devata iii. 81, 88; p. 82, Cal. Ed., where the same story is given.

† See Kaegi's Rigveda, p. 37, and note 127 on page 133. Particularly see Ludwig's Rig. iii., pp. 187-9.

Ribhus are told to rejoice with the seasons (Ritus) and this supports the latter view. In Rig. i. 15. 10, Dravineda is said to be the fourth companion of the seasons, and the Shatapatha Brahmana (xiv. 1. 1. 28) expressly states that there are three seasons. It is therefore generally believed that this was the old division of the year, and that the number of the seasons was increased as the Aryas traveled farther from their original home.* The three Ribhus, representing the three seasons, may thus be said to be engaged, throughout the whole year, in doing wonders for the gods and received as guests in the house of Agohya at the end of their course. "Here they spend twelve days in enjoyment; then the course begins anew, and anew the earth brings forth fruit, the streams flow, plants cover the heights, and waters the depths."† And now comes the verse (Rig. i. 161. 13) on which I rely—

सुषुप्तांसि नमस्तदपृच्छतामोहं क इदं नो अबुधत् ।

भानं वस्तो बोधयितारममदीत्संवत्सर इदमया व्यस्यत् ॥

Here the Ribhus, awakened from their sleep and rest for twelve days, ask "Agohya ! Who is it that awakened us ?"‡ The goat (the sun) replies that it is the "hound". Sayana understands *sheenam* to mean 'wind,' but there is no authority for it and the meaning is perfectly unnatural. In fact Sayana may be said to have failed to interpret the

* Kaegi's Rigveda, p. 116, note 68, where he quotes Zimmer to the same effect.

† This is in substance a translation of Rig. i. 161. 11 and iv. 53. 4. See Kaegi's Rigveda, p. 37.

‡ *Idem* in the first line is not the object of *abubudhat* as Sayana and Mr. S. P. Pandit suppose. It should be taken either in apposition with *tat*, or as an adverb meaning 'now' 'here' &c.

verse correctly. Ludwig and Grassmann both translate it by 'hound,' but neither of them explains what it signifies. There is again some difference of opinion as to whether the word *somvatare* should be taken with *bodhayitaram* or with *vyaakhyata*. But whichever construction we adopt the meaning remains the same, since it is the same thing if the Ribhus are said to be awakened at the end of the year and then commenced their course, or they awakened and then looked up at the beginning of the new year, or in other words, commenced their new-year's course. Practically, therefore, all agree in holding that the awakening of the Ribhus here referred to is their awakening at the end of the year, after these have enjoyed sound sleep and rest in the house of Agohya for twelve (intercalary) days, and the only question that remains is, who is the hound or the dog that awakens them? We have seen that the Ribhus were the genii of the seasons and that as companions of the sun they worked wonders during the whole course of the year. But as it was a lunar year, 12 days were intercalated at the end of each year to make it correspond with the solar year. These 12 days belonged neither to the old nor to the new year, and the Ribhus were therefore naturally believed to suspend work during this *neutral* period and spend it in rest and enjoyment in the house of Agohya. When the whole legend has thus a chronological signification it is natural to hold that the hound, here alluded to, must be some constellation in the heavens, and if so, after what has been said in the previous chapters about it, what could it be except Canis Major or the Dog-star? The end of the year here referred to is evidently the end of the three seasons, represented by the three Ribhus, and we must, therefore, take it to mean the end of the equinoctial year

or the beginning of Vasanta, the first of the seasons. Durgacharya in his commentary on Nirukta 11. 16 explains the phrase *samvatsara* (in Rig. i. 110. 4) in the same way. As I have already discussed the subject before,* I do not here repeat the grounds on which I hold that the year, in primitive times commenced with the vernal equinox. Prof. Ludwig has made a happy suggestion that *abhogaya*, which the Ribhus are said to desire (Rig. i. 110.2) before they commence their career and reach the house of the sun, should be interpreted in its ordinary sense to mean the *bend* or the inclination of the ecliptic with the equator. Our investigation, based upon independent facts leads us to the same conclusion. In short, the whole story of the Ribhus, as we find it recorded in the Rigveda, directly establishes the fact that at the time when this legend was formed the year commenced with the vernal equinox in Canis Major or the Dog-star. It is highly improbable, if not impossible, to give any other reasonable interpretation to the verse in question, whether we understand the Ribhus to mean the three seasons of the year or the rays of the sun as Yaska and Sayana have done. With the vernal equinox near the Dog-star, the winter solstice would fall on the full-moon in Phalguna and Mrigashiras would head the list of the Nakshatras. Our interpretation of the verse in question is, therefore, fully warranted by the traditions about the ancient year-beginnings given in the Taittiriya Sanhita and the Brahmanas.

Let us now examine the too much and too long misunderstood or rather not-understood hymn of Vrishakapi in the tenth Mandala of the Rigveda. As there is only one hymn in the Rigveda which gives the story, it is not so

* See *supra*, Chapter II.

easy, as in the case of the Ribhus, to determine the nature of the deity, and hence various conjectures have been made by scholars as to its origin, character and meaning. The deities appear both in the masculine and in the feminine form, Vrishakapi and Vrishakapayi. Amara* considers that Vrishakapi means either Vishnu or Shiva, and Vrishakapayi either Lakshmi or Gauri. In the Brihad-devata Vrishakapi is said to represent the setting sun, and Vrishakapayi the gloaming.† Yaska (12. 27) would derive the word so as to mean the sun who shakes (the world) with his rays, and his commentator observes that the god showers mist or dew and shakes the animate world. Modern speculations about the derivation, and the meaning of the name may be found in Bhanu Dikshita's commentary on Amara (iii. 3. 130). Prof. Max Muller, in one place,‡ observes that "it is difficult, on seeing the name of Vrishakapi, not to think of *Erikapæos*, an Orphic name of *Protagonos* and synonymous with *Phanes*, *Helios*, *Priapos*, *Dionysos*," but, says he, "the original conception of Vrisha-

* Amara iii. 3. 130 and 156. हरो विष्णुर्दृषाकपिः and दृषाकपावी श्रीगौर्योः ।

† Brihat-Devata ii. 9, and 10—

दृषाकपावी सूर्योपाः सूर्यस्वैव तु पञ्चवः ।
पुरोदशात्तामुषसं सूर्यो मध्यंदिने स्थिते ।
दृषाकपावी सूर्यस्तकाल आहुः स्तुतिर्दृषि ॥

And, again further on in ii. 69 and 70,

दृषैव कश्चित्तोः दृषकं वक्ताकमपिरीहति ।
दृषाकपिरितौ तेन विश्वस्मार्दिह उक्तरः ॥
रश्मिनिः कपयतीति दृषा वर्षिष्ठ एव सः ।
सायाह्निकाले दूतानि स्वापयन्नस्तपेति च ।
दृषाकपिरितो वा स्वाहिति नभेषु दृश्यते ॥

‡ Lectures on the Science of Language, Vol. II., p. 539.

kapi (Vrishan, bull, irrigator, Kapi, ape, tremulous) is not much clearer than that of *Erikapasee*." However, if the comparison is correct, we may, I think, take it as confirming the identification of Vrishakapi with the sun proposed by several scholars, native and European. In fact, there seems to be a general agreement that Vrishakapi represents the sun in one form or the other. But this alone does not account for all the incidents recorded in the hymn. I would, therefore, further suggest that Vrishakapi be understood as representing the sun at the autumnal equinox, when he may be rightly said to shake off the rains, inasmuch as the equinox falls at the end of the rainy season. I have previously shown that the conception of Vishnu and Shiva can be traced to the Vedic Vishnu and Rudra, and these latter may be taken as the types or the embodiments of the mild and terrible aspects of nature at the vernal and the autumnal equinox. If Vrishakapi in later mythology has therefore come to denote Vishnu and Shiva, according to Amara, the meanings are consistent with the supposition that in the Vedas Vrishakapi represents the sun at the equinoxes. In the hymn itself, Vrishakapi is said to have assumed the form of a yellow antelope whose head Indrani is described to have cut off. This circumstance serves to guide us in at once fixing the position of Vrishakapi in the heavens. It is the same antelope's head that has given rise to so many myths. When the position of Vrishakapi is thus fixed, it would not be difficult to understand the various incidents described in the hymn. But without further anticipating what I have to say in the explanation of the hymn, I now proceed to examine the hymn itself. We shall then see whether the assumption which we have made regarding the character and attributes of Vrishakapi gives us a

simple, natural, and above all, intelligible explanation of the story given in the hymn, which, as explained at present, is nothing but a bundle of disconnected, if not mutually inconsistent, statements. I shall first quote the original hymn.

वि हि सौतो॒रसृ॒क्षत॒ नैद्रं॑ दे॒वम॑मंस॒त ।

यत्रा॒मद॒दृषा॒कपि॒रर्यः॑ पु॒ष्टेषु॑ मत्स॒खा वि॒श्वस्मादि॑द्र उत्तरः ॥ १ ॥

परा॒ ही॒द्र धा॒वसि॑ वृषा॒कपे॒राति॑ व्यधिः ।

नो अ॒ह म॒ वि॒दस्य॑न्य॒ष्ट सोम॑पी॒तये॑ विश्व० ॥ २ ॥

किम॒र्य त्वां वृषा॑क॒पिश्च॒कार॒ हरि॑तो॒ नृगः॑ ।

यस्मा॑ ह॒रस्व॑सीदु॒ न्वर्यो॑ व॒ पु॒ष्टि॒वृषु॑ विश्व० ॥ ३ ॥

यमि॒मं त्वं वृषा॑क॒पिं प्रि॒यमि॑द्राभि॒रक्ष॑सि ।

श्वा न्व॑स्य जंभिष॒दपि॑ कर्णे॒ वरा॑ह्युर्वि॒श्व० ॥ ४ ॥

प्रि॒या त॒ष्टानि॑ मे क॒पिर्व्य॑क्ता व्य॒ददु॑षत् ।

शिरो॒ न्व॑स्य राविषं न सु॒गं दु॒ष्कृते॑ भुवं विश्व० ॥ ५ ॥

न मत्स्वी॒ सुभ॑स॒त्तरा॒ न सु॒याह॑त॒रा भुव॑त् ।

न म॒त्यति॑च्यवी॒यसी॑ न स॒कथु॑र्यमी॒यसी॑ विश्व० ॥ ६ ॥

उ॒वे अ॒ंब सु॒लाभि॑के य॒येवा॑ंग भ॒क्वि॒व्यति॑ ।

भ॒सन्मे॑ अ॒ंब स॒विथ॑ मे शिरो॑ मे वी॒ष ह॒व्यति॑ विश्व० ॥ ७ ॥

किं सु॒बाहो॑ स्व॒नरे॑ पृथु॒ष्टो पृथु॑जाघने ।

किं श॒रप॑त्ति न॒स्त्वम॒भ्यमी॑षि वृषा॒कपि॑ विश्व० ॥ ८ ॥

अ॒वीरा॑मि॒व बा॒मर्ष॑ शरा॒हर॑मि॒मन्व॑ते ।

उ॒ताह॑म॒स्मि वी॒रि॒णो॒पत्ति॑ म॒रुस॑खा विश्व० ॥ ९ ॥

संशोभं स्म पुरा नारी समनं वाचं गच्छति ।

वेधा ऋतस्य वीरिणीद्रपती महीयते विश्वं ॥ १० ॥

इन्द्राणीमासु नारिषु सुभगामहमश्रवं ।

नक्षत्रास्या अपुरं च न जरसा मरते पतिर्विश्वं ॥ ११ ॥

नाहमिन्द्राणि रारण सख्युर्वृषाकपेक्षते ।

यस्येदमप्यं हविः प्रियं देवेषु गच्छति विश्वं ॥ १२ ॥

वृषाकपायि रेवंति सुपुत्र आदु सुस्तुषि ।

घसत इन्द्र उक्षणः प्रियं काचित्करं हविर्विश्वं ॥ १३ ॥

उक्ष्यो हि मे पंचदश साकं पचन्ति विशति ।

उताहमधि पीव इदुभा कुक्षी पृणन्ति मे विश्वं ॥ १४ ॥

वृषभो न तिम्रमृषोन्तर्वृषेषु रोहवत् ।

मथस्ते इन्द्र शं हृदे यं ते सुनोति भावयुर्विश्वं ॥ १५ ॥

न सेशे यस्य रवंतेतरा सक्थ्या ॥ कर्पुत् ।

सेदीशे यस्य रोमशं निषेदुषो विजृम्भते विश्वं ॥ १६ ॥

न सेशे यस्य रोमशं निषेदुषो विजृम्भते ।

सेदीशे यस्य रवंतेतरा सक्थ्या ॥ कर्पुद्विश्वं ॥ १७ ॥

अयमिन्द्र वृषाकपिः परस्वंतं हतं विदत् ।

असिं सुनां नवं चरुमादेधस्वान् आचितं विश्वं ॥ १८ ॥

अयमेमि विचाकशद्विचिन्वन्दासमार्थं ।

पिबामि पाकसुत्वनोमि धीरमन्वाकशं विश्वं ॥ १९ ॥

धन्वं च मत्तन्त्रं च कतिस्त्रिंसा वि योजना ।

नेदीयसो वृषाकपेस्तमेहि' गृह्णा उप विश्वं ॥ २० ॥

पुनरेहि' वृषाकपे सुविता कल्पयावहे ।

य एषः स्वप्नं ज्ञानोस्तमेधि' पथा पुनर्विश्वं ॥ २१ ॥

यदुदं चो वृषाकपे गृह्मिद्राजगंतन ।

कः स्य पुंस्त्वचो मृगः कर्मगजनयोपनो विश्वं ॥ २२ ॥

पर्शुर्ह नाम मानवी साकं संसूव विशति ।

भद्रं भेल त्यस्या अभूयस्या उदरमामयद्विश्वं ॥ २३ ॥

There are twenty-three verses in the hymn; and of these 3, 4, 5 and 20, 21 and 22 have a direct bearing on the question we are discussing. But to understand these verses properly, it is necessary to discuss most of the other verses in the hymn, and I shall therefore examine the hymn verse by verse. I have already remarked that the hymn is one of those which have not yet been properly understood. Some of the verses have been explained by Yaska, but he has nowhere tried to give us the bearing of the whole story described in the hymn. Sayana's commentary is very often simply verbal, and in many places he too is not certain about the meaning, while the Anukramani has been several times disregarded by Sayana himself. On the other hand, Ludwig, Grassmann, and several other European scholars have tried in their own way to explain the legend or the story embodied in the hymn, and the latest attempt of the kind is that of Piscel and Geldner in their *Vedic Studies* Vol. VII., Part I.* These scholars hold that the hymn

* I am indebted for this information to Dr. B. G. Bhandarkar, who kindly undertook to explain to me the views of German scholars on this point.

narrates a legend-current in old days. In other words, they take it, and I think rightly, to be a historic hymn. But the question, what does the legend signify, or how did it originate, still remains uncolved. Pissel and Geldner understand the hymn to mean that Vrishakapi went down to the south and again returned to the house of Indra. But even then the bearing of the legend is but imperfectly explained. The occurrence of such words as *dasa*, *arya* and *parahu* in the hymn have led some to suppose that the hymn records the story of a struggle between the Aryan and the non-Aryan races. But the hypothesis hardly explains the various incidents in the story, and the legend may therefore be said to be but still imperfectly understood. Under such circumstances any suggestion which explains the hymn better is at least entitled to a hearing. It is admitted that the hymn is a dialogue between Indra, Indrani and Vrishakapi, a son of Indra as they call him.* But there is a great divergence of opinion in assigning different verses to their deities. I shall examine these points while discussing the verses.

*Katyayana in his Sarvanukramani says—विहि अधिकैरी इषाक-
पिदिशानीरश्च संदुरिरे। Upon this the Vedartha-dipika by Sadguru-
shishya has,—इषाकपिनिर्मितस्व पुनः शचीसपरम्वा ज्ञातः इन्द्रानीरपनीरश्च
स्ववर्णिति नवः संदुरिरे संहृद्योदिरे विवादे कृतवतः। The verses of the
hymn are then distributed amongst the speakers as follows—
Indra, 1, 8, 11, 12, 14, 19, 20, 21, 22; Indrani, 2, 3, 4, 5, 6, 9, 10,
15, 16, 17, 18; and Vrishakapi, 7, 13, 23. The same distribution is
given in the Brihad-devata by Shaunaka. Pissel and Geldner in-
troduce Vrishakapayi in the dialogue and distribute the verses
somewhat differently thus, Indra, 1, 3, 8, 12, 14, 19, 20; Indrani,
2, 4, 5, 6, 9, 16, 21; Vrishakapi 7, 10, 13; and Vrishakapayi
11, 15, 17, 18. Verses 23 and 22 are supposed to be addressed
by a stranger, the narrator.

VERSE 1.—The verse has been differently interpreted by different writers. Yāska (13. 4.) interprets it as referring to the rays of the sun, which (the rays) deem themselves perfectly independent of the luminary by which they were sent out. Sāyana ascribes it to Indra who says “that sacrificers, allowed by me to sacrifice to Vṛishākapi, have disregarded me, but are praising the lord Vṛishākapi who is delighted, as my friend, in the sacrifices, where plenty of Soma is used ; [but notwithstanding] this Indra is superior to all.” Mādhava Bhatta, whom Sāyana mentions with respect, however thinks otherwise. He considers that the verse is addressed by Indrānī to Indra, when she perceived that the sacrificers have ceased to sacrifice on account of the oblations being spoiled by an animal representing Vṛishākapi. He would, therefore, thus interpret the verse. Says Indrānī, “In places of plenty where lord Vṛishākapi revels, sacrificers have given up sacrificing and disregarded Indra. My friend Indra is superior to all.”

When the very first verse is thus interpreted in three different ways, one can easily attribute the difference to an imperfect perception of the bearing of the whole hymn. To me Mādhava Bhatta alone appears to have taken into consideration the verses that follow. Thus the fifth verse of the hymn states that the things of Indrānī were spoilt by Vṛishākapi in the form of an animal, and consequently he was beheaded. I should, however, like to refer to verse 21, wherein Vṛishākapi is told that when he appears again, sacrifices would be performed. This evidently implies that they were stopped before and were to be commenced again on the re-appearance of Vṛishākapi. The first verse therefore must be interpreted to mean that “the sacrifices are stopped.” The root *sri* with *vi* may mean either to

abandon or to allow, but the former is its natural meaning, and when verse 31 in the same hymn can be easily explained by taking the former meaning of *srij* with *vi*, it would be straining the words if we put a different interpretation on them. I am, therefore, disposed to interpret the verse after the manner of Mādhava Bhaṭṭa, except the last sentence.

But why should sacrifices be stopped? *What has Vṛishākapi to do with them? These are very important questions, and I am sure that had they been properly answered, there would have been no difficulty in interpreting the hymn. In verse 3 we are told that Vṛishākapi, spoken of in this hymn, has the form of a yellow antelope. In verse 5 Indrāṇī is prepared to cut off his head, because he offended her, and in the preceding verse (4th) a dog is said to be let loose upon him. These facts—an antelope with the head cut off, and a dog closely following him—are quite sufficient for the purposes of identification. They shew that the whole story is based upon the “antelope’s head” we have previously discussed; and had Yāska and Sāyana known that there is a constellation called dog in the heavens by the side of Mrigashiras, I feel certain that they would not have hesitated to recognize in Vṛishākapi, the sun as represented by the constellation of Orion. But all traces of the dog, as a constellation, having been lost in the Sanskrit literature, neither Yāska nor Sāyana could find any clue to the true meaning of the hymn. This is not, however, the only place where Yāska has been obliged to invent extraordinary interpretations. Not knowing that the dog represented a star, he has proposed (Nirukta 5. 20), that *Vrika* should be understood to mean “the moon,” while usually it means a wolf or a wild dog, and it appears to

me that a similar mistake has been also committed here. Comparative Mythology and Greek Astronomy have, however, thrown further light on the subject, and we must now try to interpret the hymn accordingly. Vṛishākapi must, therefore, be taken to represent the sun in Orion.

But even supposing the Vṛishākapi thus represents the sun in Orion, why should the sacrifices be stopped on his account? The identification of Vṛishākapi with Orion at once furnishes us with a solution of this question. We have already seen that the dog is said to commence the new year in R̥ig. i. 161. 13; and since Canis and Orion are close to each other, Orion may also be said to have commenced the year. The Devayāna, therefore, extended in those days from the heliacal to the acronycal rising of Orion; that is, when Orion rose with the sun, it was the vernal equinox, the beginning of the Devayāna, and six months after, when it rose at the beginning of night, it was the autumnal equinox, the end of the Devayāna. Now all *Deva*-ceremonies and sacrifices could be begun and performed only during the Devayāna,* or as we find it in later traditions, only in the Uttarāyana. The acronycal rising of Orion was thus a signal to stop such ceremonies, and oblations could properly be said to have been spoilt by the appearance of this constellation at the beginning of night.† But above all the burden of the song “Indra is *uttara* of all,” becomes specially appropriate in this case. The word *uttara*

* Jaimini Mim. Dar. vi. 8. 23, and other authorities cited in Chap. II.

† If Vṛitra is correctly identified with the constellation of Mṛigashiras, we may on the same theory also explain why he is called *Makhasyu* in R̥ig. x. 73. 7. The appearance of Mṛiga, at the beginning of night, indicated the commencement of the Dakṣhiṇāyana when sacrifices were stopped. Vṛitra *alias* Mṛiga might thus come to be regarded as a destroyer of the sacrifices.

does not here mean superior, but “upper” implying that Indra is in the upper or the northern portion of the universe, though the sun or Vṛishâkapi may go down. I would, therefore, translate the first verse thus—“Where my friend Vṛishâkapi rejoiced in the wealth of the Aryans, they gave up sacrificing and did not respect Indra. Indra is (however) in the upper (*i. e.*, northern) part of the universe.”*

VERSE 2.—Indra is here reproached for following up Vṛishâkapi, though he has offended Indrâñi. Says she to Indra: “O Indra! (how is it that) you run down fast after Vṛishâkapi and do not go anywhere else to drink Soma. Indra is, &c.”

The word *parâ* in this verse seems to denote the region where Vṛishâkapi has gone. *Parâvat* is often said to be the place in the distant or lower portion of the sphere, and is thus contrasted with *arâvat* (Rig. viii. 13. 15). In Rig. viii. 33. 10 Indra is said to be Vṛisha in the *parâvat* and also in the *arâvat* regions. Indra is again very often spoken of as going to distant regions to see whether Vṛitra is duly killed. The same fact appears to be here expressed in a different form.

VERSE 3.—Sâyana following the Anukramanî, understands the verse as addressed by Indrâñi to Indra. Ludwig and Grassmann, on the other hand, take it to be addressed by Indra to Indrâñi: and this construction seems better than that of Sâyana. It may, however, be here, once for all, remarked that though scholars thus differ in assigning verses to different deities, yet it does not, on the whole, materially alter the legend incorporated in the hymn.

* If Vṛishâkapâyî is to be at all introduced in the dialogue, we may assign this verse to her. The phrases, “my friend” and “did not respect Indra,” would be more appropriate in her mouth than in that of Indra or Indrâñi.

Says Indra : “ What has this Vṛiṣhākapi, in the form of a yellow antelope, done to thee that you are so much angry with him ? Was it the rich possession (wealth) of the Aryans ? Indra &c.”

The form, in which Vṛiṣhākapi is here said to have appeared, should be specially noted. *Harita* means yellow, and yellow animals (*Haritah*) are said to be yoked to the carriage of Âditya in Nighaṇṭu (1. 15). There the word is, however, understood to be the plural of *Harit*, by the commentators in conformity to Rîg. i. 115. 3 and v. 45. 9, where the sun is said to have seven horses yoked to his carriage. But I think that the same idea may give rise to the conception that the sun is represented by a single yellow animal, and we may take the passage in the Nighaṇṭu as referring also to the verse under consideration. I have previously alluded to the fact that the dog at the Chinvat bridge in the Parsi traditions is described as *zaritem*, that is, of the same colour as the antelope in the third verse. But the question of colour cannot be taken as finally settled until we first definitely decide what animal is represented by Mṛiga.*

VERSES 4 & 5.—Sâyana is literally correct, but again misses the spirit, or rather has missed it throughout the hymn. Indra was reproached in the second verse for his partiality or over-kindness to Vṛiṣhākapi. But Indrâni was not satisfied with it, and if Indra failed to punish the Kapi, she took the matter in her own hand. Says she : “ O Indra ! as you (thus) protect this (your) favourite Vṛiṣhākapi, let the dog, eager (to chase) a hog (*varâha*), bite him at his ear. The Kapi spoilt my favourite things.† I shall, there-

* See Dr. Rajendralal's Indo-Aryans, Vol. II., p. 303.

† The word in the original is *tashṭani*, which literally means made, shaped, &c. Mâdhava Bhaṭṭa understands it to mean

fore, cut off his head, in order that an evil-doer may not enjoy happiness. Indra is in the upper (portion) of the universe." Here Indrāṇī is herself prepared to punish Vṛishákapi by setting the dog at his ear, and cutting off his head. I have in a previous chapter shown how the figure of Mṛiga's head is to be obtained in the sky. Taking the three stars in the belt of Orion as the top of the head, the dog is close by the right ear of Mṛiga and may properly be said to bite it. The word *varāha* also points out the place where we may expect to find the dog. In Rīg. i. 61.7, *varāha* * is said to be killed by Viṣṇu beyond a mountain, which, in all probability, is the same story as that of Indra killing Vṛitra. A dog chasing *varāha* is therefore no other than Canis Major following the constellation of Orion, or the "antelope's head" representing Vṛitra. Sāyaṇa and Yāska, and even European scholars are silent as to who this dog is. The verses, in fact, may be said to have remained altogether unexplained hitherto, though the words themselves are simple enough and have caused no difficulty.

VERSE 6.—This verse presents no difficulty. Thus satisfied, Indrāṇī speaks of herself as the best of women, best in every way.

VERSES 7 & 8.—Indra now tries to conciliate her. Sayana, following the Anukramaṇī, supposes that the seventh verse is addressed by Vṛishákapi and the eighth by Indra. The only reason I can find for such an interpretation is the

oblations offered to Indrāṇī. I translate it by things generally. Whatever meaning we may adopt, it is quite evident that the Kapi's interfering with them has offended Indrāṇī.

* In Rīg. x. 99. 6, Indra is said to have killed Trishirshan, and with his aid Trita killed *varaha*.

occurrence of the word *ambā*, which means “mother,” and this cannot be supposed to be used by Indra. But though we avoid one difficulty in this way, we are launched into another, for the verse speaks of Indrāṇī being pleasing “to me;” and if Vṛiṣhākapi is the speaker, “me” cannot refer to him, as Indrāṇī is his mother and, consequently, “me” has to be interpreted to mean “my father,” and this Sāyana has done. I prefer taking *ambā* as an affectionate and respectful mode of address, as in modern Sanskrit, and the verse presents no difficulty. We can then take both the 7th and the 8th verse together and give them a natural interpretation. I translate thus “O auspicious lady! what you say is true . . . you are pleasing to me . . . But oh! hero-wife, with beautiful arms, pretty figure, profuse hair, and broad hips, why should you be so angry with our Vṛiṣhākapi? Indra is in the upper (part) of the universe.”

VERSE 9.—Indrāṇī replies. “This mischievous (Vṛiṣhākapi) considers me to be *avirā* (*i. e.*, without a brave husband or son), while I am the wife of Indra, the mother of the brave, and the friend of Maruts. Indra, &c.”

VERSES 10 & 11.—Pischel and Geldner suppose that the first is addressed by Vṛiṣhākapi to Indrāṇī, and the second by Vṛiṣhākapyāī. Sāyana understands them to be addressed by Indra. Whichever construction we adopt, the meaning remains the same. Indrāṇī is here told that she is highly respected everywhere; she is the blessed of all women, and that her husband never suffers from old age. This is obviously intended to pacify her.

VERSE 12.—Indra says “O Indrāṇī! I am not delighted without my friend Vṛiṣhākapi, of whom these favourite

watery oblations reach the gods. Indra is in the upper (part) of the universe.’

VERSE 13.—This seems to be also addressed by Indra to Indrāñī, who is here called Vṛishākapyāī. This latter name has caused a difference of opinion, some considering Vṛishākapyāī to be the mother, some the wife of Vṛishākapi.* I do not see how the wife of Vṛishākapi, as such, could be introduced in the song, unless Vṛishākapi is understood to be the name of Indra himself. Commentators, who take Vṛishākapyāī to mean the wife of Vṛishākapi, accordingly adopt the latter view. Pischel and Geldner think that the verse is addressed by Vṛishākapi to his wife Vṛishākapyāī. The verse means, “O rich Vṛishākapyāī! having a good son and a daughter-in-law, let Indra swallow the bulls, your favourite and delightful oblation. Indra, &c.” There has been much speculation as to who could be the son and the daughter-in-law of Vṛishākapyāī. But if Vṛishākapyāī be understood to mean the wife of Indra, it causes no such difficulty. The adjectives “having a good son,” &c., are simply complimentary, corresponding to the statement of Indrāñī, that she was the “mother of the brave” in verse 9. Indra accepting her statements, asks her to allow him to swallow the watery oblations said to come from Vṛishākapi in the last verse. The words *priyam* and *havis* are the same in both the verses; and I think that both of them refer to the same oblations.

VERSE 14.—Indra, satisfied with the prospect of getting the oblations, describes his appetite: “Twenty and fifteen oxen are being cooked for me; I shall eat them and be fat. Both the sides of my belly will be filled up. Indra, &c.”

* See Max Müller's Lectures on the Science of Language, Vol. II., 538.

The practice of sacrificing bulls to Indra seems to have been out of date even at the time of the R̥gveda (cf. i. 164. 43, where it is said to be an old custom). But the old custom could not be entirely forgotten, and if real bulls were not offered to Indra, poets supposed that clouds or stars might answer the same purpose. The number 35 mentioned in the verse may thus refer to the Nakshatras (38), and planets (7). But this explanation is doubtful, and I cannot suggest a better one.

VERSES 15, 16 & 17.—The fifteenth and the sixteenth seem to be addressed to Indra by Indrāñī, and the seventeenth to Indrāñī by Indra. In the fifteenth Indrāñī, according to Sāyana, asked Indra to sport with her just as a bull, with pointed horns, roars amongst a number of cows. The next two verses do not appear to be relevant to our purpose. We may, therefore, pass these over, and resume the thread of the story. Pischel and Geldner suppose that the 17th and 18th verses are addressed by Vṛishakapāyī.

VERSES 18 & 19.—Indrāñī is now conciliated, and says that she has not killed Vṛishākapi, but some one else. The verse thus means, “O Indra! let Vṛishākapi get the slain animal—an animal which was quite different from Vṛishākapi’s. Let him at once have a knife, a fire-place, a new vessel, and a cart-load of fire-wood (to cook the killed animal). Indra, &c.” Thus by the intercession of Indra, Indrāñī was moved, and at last undid or rather explained away her previous act of decapitation. Pischel and Geldner translate the verse very nearly as I have done. They, however, consider it to be addressed by Vṛishakapāyī and translate *parasvantam* by ‘wild.’ This does not explain what dead animal is here referred to. It is, I think, more natural to suppose that the dead animal here spoken of is

the same as that described in verse 5, and one whose head Indrâṇī is there said to be ready to cut off. Indrâṇī now says that this dead animal should be given to Vṛishâkapi, especially as Indra has already got his oblations of bulls. I have already shown that there were several legends about the "antelope's head." It seems that Indrâṇī, referring to some of them, assures Indra that it was not Vṛishâkapi in the form of the antelope which she killed, but some one else (literally *parāsvantam* = representing another than Vṛishâkapi, as Sâyana takes it). Thereon Indra, having thus saved Vṛishâkapi by his intercession, observes, "Thus do I go seeing and discriminating between a *dasa* and an *arya*; I take my drink from those that prepare Soma juice and cook the oblations, and thus behold or protect the intelligent sacrificers." In another word, Indra is glad that he has saved an Ārya, and triumphantly declares that he is always careful to distinguish between an Ārya and a Dāsa, the latter of whom he would punish and kill, *e. g.*, Vṛitra, who is said to be a Dāsa. Vṛishâkapi being thus saved Indra, in the following verses, bids him a farewell, wishing for a safe journey and speedy return. These verses are very important for our present purpose, and I shall, therefore, examine them singly.

VERSE 20.—In this verse Indra asks Vṛishâkapi to go to his house (*astam*) and then return afterwards to the house (*grihas*) of Indra. But the question is where is Vṛishâkapi's house and where is that of Indra? The words in the original are *dhanva*, *kṛintatra* and *nedīyas*. Vṛishâkapi is asked to go to *dhanva*, which is also *kṛintatra*. Sâyana takes *dhanva* to mean a desert and *kṛintatra* in the sense that "the trees therein are cut off." But this meaning does not quite suit the context. What is meant by saying that Vṛishâkapi, who is admittedly the sun in a different

form, should go to a forest? Where is that forest, and what does it imply? *Dhanva* is a word that occurs several times in the R̥gveda. In R̥g i. 35.8 it is said to consist of three *yojanas* and is contrasted with the earth. Śāyana there understands it to mean "sky or heavens;" and I see no reason why we should not interpret the word in the same way in this verse. *Dhanva* therefore means "sky" or "heavens." But is it the vault above with three stages? No, the poet qualifies the idea by *kṛintatra*, meaning "cut off." It is thus evidently the portion of the heavens which is cut off. In other words, the idea here denoted is the same as that expressed by the phrase *avarodhanam divah*—"where heavens are closed," or "where the view is obstructed," in R̥g. ix. 113.8. *Dhanva* which is *kṛintantra*,* thus denotes the innermost part of the celestial sphere, the southern hemisphere or the *Pitṛiyanā*. The poet knows that the vault of the heavens above him has three halts or stages which Viṣṇu is said to have used as his three steps (R̥g. i. 22. 17). But of the *nether* world the poet has no definite knowledge, and he therefore cannot specify the *yojanas* or the stages it contains. Thus he simply says that there are *some yojanas* therein. The first part of the verse may now be translated thus: "O Vṛiṣhākapi! go to the house (in) the celestial sphere which is cut off and which contains *some yojanas* or stages." In short, Indra means that Vṛiṣhākapi should now descend into the southern hemisphere.

The latter part of the verse literally means "and come to our house from *nedīyas*." Now *nedīyas* is again a

* The only other place where *kṛintatra* is used in the R̥gveda is v. 27. 13, which Yāska and Śāyana both interpret to mean that "waters come up from *kṛintatra*, i.e., a cloud." But it may be as well asked if *kṛintatrat* cannot here mean "from below."

word which neither Yāska nor Sāyaṇa seem to have properly understood. Pāṇini (v. 3. 63) tells us that *nedīyas* is the comparative of *antika*. Now *nedīyas* cannot possibly be derived from *antika* by any change in the form of the latter word. Pāṇini therefore considers *neda* to be a substitute for *antika*, when the comparative form is to be derived. This is equivalent to saying that 'bet' is to be substituted for 'good' in deriving the comparative form of 'good' in English. I need not say how far such an explanation would be regarded satisfactory. My own view is that *nedīyas* had lost its positive form in the times of Pāṇini, or perhaps its positive form was never in use like that of 'superior' in English. But Pāṇini, who, as a grammarian, felt bound to account for all the forms, connected *nedīyas* with *antika*, probably because the ordinary meaning of *nedīyas* in his time was the same as that of the comparative form of *antika*. But we cannot infer from this that *nedīyas* might not have meant anything else in the days of Pāṇini. Pāṇini might have taken into account only the most ordinary sense of the word, and finding that a positive form was wanting connected it with the word which expressed the ordinary meaning in the positive form. The fact that Pāṇini considers *nedīyas* as the comparative of *antika* does not, therefore, preclude us from assuming, if we have other grounds to do so, that *nedīyas* originally meant something else in addition to its present sense; for Pāṇini speaks of the *form* and not of the meaning of *nedīyas*. Having thus shown that the authority of Pāṇini is not against me, I shall now give my meaning of *nedīyas*. I think it means lower, being akin to *neath*, *beneath*, *nether** and corres-

* Bopp derives O.H.G. *nidar* from Sk. *ni* down, and disapproves Grimm's suggestion that it should be traced to a Gothic

ponding words in other languages. The suggestion, I know, will be received by some with surprise and suspicion, and I must give by grounds for proposing a new meaning. There is no passage in the R̥igveda where the use of *nediyas* might be considered as definitely deciding its meaning. In R̥ig. v. 52. 6, viii. 26. 10 and x. 101. 3, *nedishtha* or *nediyas* might be supposed to mean lowest or lower. But the passages are not conclusive on this point, as the word there used might also be understood to mean 'nearest,' 'nearer,' according to Pāṇini. In the Brāhmaṇas we, however, meet with more decisive passages. Thus in the Aitareya Brāhmaṇa vi. 27 *nediyas* is contrasted with *upariśtāt*.* Böhlingk and Roth give a passage from the Kāthaka recension of Yajurveda (28. 4), which says, "he ascends (*ārohati*) to the heavens from the *nethishtha* world."* Here the word 'ascend' clearly shows that the *nethishtha* world must be understood to mean the 'lowest world,' 'world at the bottom.' In the Tāndya Brāhmaṇa (iii. 4, 2,

verb *nithan*, *nath*, *nethum*, and divided as *nid-ar*, *ar* being a comparative termination. (Bopp, Com. Gr. Eng. Tr. 1860, vol. I., p. 382). K. Brugmann compares Sk. *nediyas* with Av. *nazd-yah* meaning 'nearer,' and derives the words from *nazd* (*ni* down and *sed* to sit). Cf. Sk. *nida* Lat. *nidu*, O. Ir. *net*, O. H. G. *nest* = a resting place (Comp. Gr. i., § 591, ii. §§ 4, 135). Both Bopp and Brugmann do not propose any new meaning of *nediyas*. But it is evident that whichever derivation we adopt the word is connected with *ni* down, and if we find passages in the Brāhmaṇas where it is contrasted with *upariśtāt*, we can, I think, safely understand *nediyas* to mean 'lower' as suggested by its etymology; 'nearer' is a secondary meaning.

* उपरिष्ठादेव नीयसि नामे Ait. Br. vi. 27.

† नेदिष्ठादेव स्वर्गलोकमारोहति । Kāthak. 28. 4.

13, 2) there occurs a passage where the directions for lowering the tone are given as follows—"Just as after creeping up to the top of a high tree (a man) gradually comes lower and lower so, &c."* The word for lowering in the text is *nediyas sankramāt*, and there is no possibility of mistaking its meaning. In the Tāndya Brāhmaṇa ii. 1. 3 the raising of the tone is described as ascending from top to top (*agrāt agram*) ; and *nediyas sankrama* must, therefore, mean a gradual lowering of the voice. In fact, *nediyas sankrama* represents the same idea as *low-er-ing*, that is, not taking a sudden leap down but descending from the highest point to the next lower, and so on. In all these places Sāyana explains *nediyas* as meaning 'nearer' according to Pāṇini; but in every case he has to strain the words to suit the context. It was not, however, Sāyana's fault; for after *nediyas* was once assigned to *antika*, all traces of its old meaning were naturally lost, and none dared to question Pāṇini's authority. But we now know that in other languages *neath* means low, and in several passages in the Brāhmaṇas, we find *nediyas* contrasted with 'upper' or 'top.' This, in my opinion, is sufficient to prove that *nediyas* meant lower in the Vedic times. I have already shown that the authority of Pāṇini is not against understanding the word in this way. All that he has laid down is that *nediyas* having no positive form should be derived from *antika* without saying whether *nediyas* was or was not used in any other sense. I am, therefore, inclined to think that *nediyas* might have had more than one meaning even in Pāṇini's time, but he took the most ordinary meaning and derived the comparative form from *antika*. This in course

* यथा महावृक्षस्याय सुपथा नेदीयः संक्रमात् संक्रामत्येवमेतन्नेदीयः संक्रमया नेदीयः संक्रमात् संक्रामति । Tān. Br. iii. 4. 2.

of time served in its turn to restrict the denotation of the word only to one meaning, *viz.*, 'nearer.'

I would, therefore, translate the verse thus, "O Vṛiṣhākapi! go to the house—the celestial sphere which is cut off and which contains some (unknown) *yojanas* or stages. From your *nether* house come to our house. Indra is in the upper (portion) of the universe." *Nediyas* is thus contrasted with *uttara* in the burden of the song. Both are comparative forms. Indra is in the *uttara* (upper) regions, while Vṛiṣhākapi is going to the *nediyas* (lower) world; and Indra expects or rather requests Vṛiṣhākapi to come back again to his (Indra's) house. That is the gist of the whole verse. The idea that the sun *falls* down from the autumnal equinox is an old one. In Ait. Br. iii. 18 and in Taitt. Br. i. 5. 12. 1 the ceremonies on the Viṣhṭvān or the equinoctial day in a *satra* are described, and there we are told that "gods were afraid of the sun *falling down* from the sky and so supported him," and being thus supported he "became *uttara* to all. The Ait. Br. iii. 18 has thus the same word *uttara* that we have in this verse, and it is natural to suppose that both relate to the same subject. I have also quoted a passage from the Aitareya Brāhmaṇa where *nediyas* is contrasted with *upariṣṭāt*. From these I infer that the verse, we are now considering, describes the descent of the sun into the southern or the lower hemisphere, and that Indra asks him to come back again to the house of gods, *i.e.*, the northern hemisphere. I have already given in full my reasons for understanding *nediyas* in a different sense. But I may remark that, even accepting the common meaning of the word, the verse may still be interpreted in the way I have suggested.

VERSE 21.—Vṛiṣhākapi has gone down to the nether

world. This verse now describes what Indra will do when he returns. Says Indra, "O Vṛishākapi ! you, the destroyer of sleep, who are going to the house, come back again, again by (your) way. We would perform the sacrifices. Indra, &c." The verse thus distinctly refers to the recommencement of the sacrifices in the Devayāna or the Uttarāyana as understood in old days. The word *suvitā* is from the same root as *vaitānika* and *kalpaḡārahai* is from *kṛip*, the root which gives us the word *kalpa* in *kalpasūtras*. *Surita kalpayārahai* thus means "we would perform the *vaitānika* ceremonies," which, as described in the first verse, were stopped when the sun went down to the nether world. I may also here point out that the house in the nether world or, as Sāyana interprets it, the house of the enemy is called *asta* literally 'thrown,' while Indra's house is called *griha*. The sun goes down to the *asta* and returns up to the *griha* of Indra. This verse, in so far as it speaks of the recommencement of sacrificial ceremonies, confirms the interpretation I have proposed for the preceding verse.

VERSE 22.—This is the most important verse in the whole hymn. It describes the circumstances under which Vṛishākapi will return to Indra's house. Literally rendered it means, "O mighty Vṛishākapi !* when you rising up-

* Pischel and Geldner suppose that the verse is addressed by a third person to Vṛishākapi and Indra, probably because both these names occur in the vocative case and the verb is in plural. In that case the verse would mean, "When Indra and Vṛishākapi would both be in the house, where would the sinning Mṛiga be, &c.?" This interpretation does not, however, make any change in the part of the verse material for our purpose. For whichever construction we adopt the question still remains—why is the Mṛiga invisible when both Indra and Vṛishākapi are together ?

wards (or rather northwards) would come to (our) house, where would that great sinner *Mṛiga* be? Where he, who misleads people, would go? Indra, &c." Now Yāska, in whose days all traces of *Canis* being once a star in the heavens were lost, could not understand what to make of the statement "where would that great sinner *Mṛiga* be?" It means that *Mṛiga* would not be seen, would not be visible, when *Vṛiṣhākapi* goes to the house of Indra; but Yāska did not perceive what was intended by such a statement. He could not conceive that the constellation of *Mṛigashiras* would be invisible, when the sun in his upward march would be there at the beginning of the *Devayāna*, that is, when he comes to the house of Indra, and therefore he proposed to interpret *Mṛiga* in the sense of "the sun" (*Nirukta* 13. 3). *Mṛiga*, says he, is derived from *mṛij* to go, and means "going," "one who goes and goes and never stops," in other words, "the sun." Now, says his commentator, when a person goes into a house he cannot be seen by the outsiders. So *Vṛiṣhākapi*, when he goes to the house, cannot be seen by the people on the earth! I do not think that I need point out the highly artificial and inconsistent character of this explanation. The word *Mṛiga*, so far as I know, is nowhere used in the *Rigveda* in this sense. Again, if the word *Mṛiga* in the third verse of this hymn is to be understood as meaning an antelope, is it not natural enough to suppose that the same *Mṛiga* is referred to in this verse? Then, again, how can the sun be said to become invisible to the people when he is in the house of gods? Nor can he be invisible to Indra whose house he enters. What can, in such a case, be the propriety of the word *udancha* or "rising upwards"? If *Mṛiga* means the sun according to Yāska, we shall have to suppose that the

rising sun was *invisible*, a clear contradiction in terms. I am sure Yāska here tried to explain away the difficulty in the same way as he has done in the case of *Vṛika*. But, in the present instance, the solution he has proposed is, on the face of it, highly inconsistent, so much so that even Sāyana does not follow it. Sāyana, however, has nothing else to propose, and he quietly leaves the word *Mṛiga* as it is and unexplained in his commentary. In short, both Sāyana and Yāska have found the verse too difficult to explain. The meaning I have proposed explains the verse in a natural and a simple manner, and further corroborates the statement in the *Rigveda* previously referred to, *viz.*, “Canis awakened the Ribhus at the end of the year.” In the *Taittiriya Brāhmaṇa* i. 5. 3. 1, we are told that the Vedic priests, *e. g.*, Mātsoni, observed the position of the sun amongst stars in the morning, and, as the *Nakshatras* disappear when the sun rises, they determined the position by observing what *Nakshatra* rose a little before the sun. The present verse records an observation to make which no greater skill is required. It tells us that when *Vṛishākapi* went to the house of Indra his *Mṛiga* was not visible anywhere, thus clearly indicating that the sun rose with Orion on that day. The word *udancha* is especially remarkable in this case. The sun must be *udancha* when he goes to the house of Indra, which, the burden of the song tells us, is in the northern or the upper part of the universe. This verse, therefore, clearly describes not merely the *rising* sun but the position of rising sun amongst the constellations when he is at the vernal equinox, the entrance of the house of gods or the house of Indra. Sāyana and Yāska have completely missed this point, and have made *Vṛishākapi* represent the rising sun as an unnecessary rival to *Savitā*

(Nirukta 12. 12). If the meaning I have proposed is correct, we have here a record of the position of the sun at the vernal equinox. I take *pulvaghās* in the original to mean "great sinner;" but it may be translated as Yāska proposes by "omnivorous" or "voracious." But in either case I would take it as referring to the antelope's spoiling the things of Indrāṇi. The point is that the sinning Mṛiga would not be with Vṛiṣhākapi when he again goes to the house of Indra, and Indrāṇi would have no cause to complain of the presence of the odious Mṛiga at the time.

VERSE 23.—Sayana translates, "O arrow! Mann's daughter, named Parshu, gave birth to twenty (sons) together. Let her whose belly was big be happy! Indra is in the upper (portion) of the universe." I cannot, however, understand what it means. Parshu, according to Sayana, is a Mṛigi or a female antelope. But why address the arrow to give happiness to her? Can it have any reference to the arrow with which Orion was killed? Then who are these twenty sons? Are they the same as twenty mentioned in verse 14? Is it likely that twenty alone are mentioned leaving the additional fifteen to be understood from the context? The concluding verse undoubtedly appears to be benedictory. But I have not found a satisfactory solution of the above questions. Perhaps *bhala* meaning 'auspicious,' may be used for Vṛiṣhākapi, and Indra addressing him pronounces benediction on the female that gave birth to the yellow antelope and several other stars that are supposed to be either killed or swallowed by Indra in this hymn. But I cannot speak with certainty on the point and must leave the verse as it is.

Now let us see what are the leading features of the story of Vṛiṣhākapi and what do they signify. We have seen

that scholars differ in assigning the verses of the hymn to the different speakers, and here and there we meet with expressions and words which cannot be said to be yet satisfactorily explained. Some of the interpretations I have proposed may not again be acceptable to all. But these difficulties do not prevent us from determining the leading incidents in the legend, which may, therefore, be summarised somewhat as follows. Vṛishākapi is a Mṛiga, and sacrifices are stopped where he revels. He is, however, a favourite of Indra, and consequently the latter, instead of punishing, follows him. Indranī, who has herself been offended by the Kapi, now reproaches Indra for his overfondness for the animal and threatens to punish the beast by cutting off his head and letting loose a dog at his ear. Indra intercedes and Indranī assures him that the punishment has not been inflicted on his favourite beast, but on someone else. Vṛishākapi is now going down to his house and Indra, in bidding farewell to his friend, asks him to come up again to his (Indra's) house, so that the sacrifices may be recommenced; and, strange to say, that when Vṛishākapi returns, in his upward march to the house of Indra, the impertinent Mṛiga is no longer to be seen! Vṛishākapi, Indra and Indranī thus finally meet in the same house, without the offensive beast, and the hymn therefore concludes with a benedictory verse.

There can be little doubt that the hymn gives a legend current in old Vedic days. But no explanation has yet been suggested, which accounts for all the incidents in the story or explains how it originated. Vṛishākapi is a Mṛiga, and his appearance and disappearance mark the cessation and the recommencement of the sacrifices. The Indian tradition identifies him with the sun in one form or another and

comparison with Greek *Erikapæos* points to the same conclusion. Our Vṛishākapi or Mṛiga must again be such as is liable to be conceived in the form of a head cut off from the body, and closely followed by a dog at its ear, unless we are prepared to treat the very *specific* threat of Indrāṇī as meaningless except as a *general* threat. All these incidents are plainly and intelligibly explained by taking Vṛishākapi to represent the sun at the autumnal equinox, when the Dog-star or Orion commenced the equinoctial year; and, above all, we can now well understand why Vṛishākapi's house is said to be low in the south and how his Mṛiga disappears when he goes to the house of Indra—a point which has been a hard knot for the commentators to solve. I, therefore, conclude that the hymn gives us not only a description of the constellation of Orion and Canis (verses 4 and 5), but clearly and expressly defines the position of the sun when he passed to the north of the equator in old times [verse 22]; and joined with the legend of the Ribhus we have here unmistakeable and reliable internal evidence of the hymns of the Rigveda to ascertain the period when the traditions incorporated in these hymns were first framed and conceived. In the face of these facts it is impossible to hold that the passages in the Taittiriya Saṁhitā and the Brāhmaṇas do not record a real tradition about the older beginning of the year.

CHAPTER VIII.

CONCLUSION.

Results of previous chapters—Winter solstice in Phālguna and Māgha—Successive year-beginnings in old times stated and explained—The second traditional year-beginning in the Taittiriya Sanhitā—Winter solstice in Chaitra and vernal equinox in Punarvasu—Vedic traditions corroborating the same—The commencement of the sacrifice with Aditi, the presiding deity of Punarvasu—The Abhijit day—The asterismal Prajāpati with Chitrā for his head—THE CONCLUSIONS—Periods of ancient Vedic literature stated and described—The Pre-Orion Period, 6000—4000 B. C.—The Orion Period, 4000—2500 B. C.—The Krittikā Period, 2500—1400 B. C.—Pre-Buddhist Period, 1400—500 B. C.—Not inconsistent with the results of Comparative Philology or Mythology—Rate of the precession of the equinoxes—Correctly determined by the Hindus—Continuous record of the different positions of the equinoxes in Sanskrit literature—Traditions based upon the same—Prajāpati, Rohini and Rudra—Meaning of Rohini—The Krittikās in the Taittiriya Sanhitā and Vedānga Jyotisha—The equinox in Ashvini in later works—Story of Vishvāmitra—Notices of the recession of the rainy season from Bhādrapada to Jyeshtha—Conclusions shewn to be consistent with the traditions regarding the antiquity of Zoroaster and the Vedas.

WE have thus traced back one of the traditions about the old beginnings of the year, mentioned in the Taittiriya Sanhitā, to the oldest of the Vedic works, and what is still more important, shown that the Vedic traditions are in this respect completely corroborated by the oldest records and traditions of the other two sections of the Aryan race—the Parsis and the Greeks. The traditions of each nation taken singly may not be conclusive, but when, putting all these together and interpreting one set in the light of another, we find that directly or indirectly all point to the same conclusion, their cumulative effect cannot but be

conclusive. Scholars have already discovered the similarity between the traditions of the three nations, but without any clue to the period when all the Aryas lived together, it was impossible to reduce all these traditions into a harmonious whole. The traditions of Orion, and especially its position at the beginning of the equinoctial year, do, however, supply such a clue, and with its help the mystery about the oldest periods of Aryan civilization is considerably cleared up. Thus if Orion is now no longer a hunter of unknown parentage, we need not also indulge in uncertain speculations about the foamy weapon with which Indra killed his enemy, or how the four-eyed dogs came to be stationed at the Chinvat Bridge, or why the Ribhus are said to be awakened by a dog at the end of the year.

Astronomically the matter is as simple as it could be. All our measurements of time are directly based upon the changes in the positions of heavenly bodies. But there is no measurement of time, at present determined, which is longer than the period during which the equinoxes complete their revolution in the ecliptic. It is, therefore, the best measurement of time for determining the periods of antiquity, only if we have reliable records about the position of heavenly bodies in early days. Fortunately, such records of the time, when the Hellenic, the Iranian and the Indian Aryans lived together, have been preserved for us in the R̥gveda, and with the help of the Greek and the Parsi traditions we can now decipher these records inscribed on the specially cultivated memory of the Indian Aryans. Commencing with the passages in the Taittirīya Saṁhitā and the Brāhmaṇas, which declare that the Phalgunī full-moon was once the new-year's night, we found that Mṛga-shiras was designated by a name which, if rightly inter-

puted, showed that the vernal equinox coincided with that asterism in old times. This was, so to speak, a sort of corroborative evidence of the truth of the statement in the *Taittirīya Sanhitā*. A reference to the figure will show at a glance that if the sun be at the winter solstice on the Phalgunī full-moon day, the moon to be full must be diametrically opposite to the sun and also near Phalgunī. Uttarā Phalgunī will thus be at the summer solstice and the vernal equinox will coincide with Mṛigashiras. With the solstice in Māgha, the equinox will be in the Kṛittikās; while when the Uttarāyana begins in Paus̥ha the equinox is in Ashvinī. Ashvinī and Paus̥ha, Kṛittikās and Māgha, and Mṛigashiras and Phālguna are thus the correlative pairs of successive year-beginnings depending entirely upon the precession of the equinoxes; and the facts, statements, texts and legends discussed in the previous chapters supply us with reliable evidence, direct and indirect, of the existence of all these year-beginnings in the various periods of Aryan civilization. It has been further shown that not only the traditions, but also the primitive calendar of the Parsis bears out the conclusions we have deduced from the Vedic works.

We have so far considered only one of the traditional year-beginnings recorded in the *Taittirīya Sanhitā*, the Phalgunī full-moon. But it may be asked how we interpret the other mentioned along with it, and almost in the same words. Analogy at once suggests that we should interpret it in the same way as we have interpreted the first. With the Phalgunī full-moon, at the winter solstice the vernal equinox was in Mṛigashiras; so with the Chitrā full-moon at the solstice the vernal equinox would be in Punarvasū. Let us, therefore, see if we have any evidence in the Vedic literature in support of such an interpretation. It may be

observed that we are here entering upon the remotest period of antiquity, when the year was probably first determined with some approach to accuracy; and even in the Vedas there is hardly anything beyond vague traditions about this period, while the Greeks and the Parsis have not, it appears, preserved even these.

There is no express passage which states that Punarvasû was ever the first of the Nakshatras, nor have we in this case a synonym like *Agrahâyana*, or Orion, wherein we might discover similar traditions. There are, however, some indications about the oldest position of Punarvasû preserved in the sacrificial literature. The presiding deity of Punarvasû is Aditi, and we are told in the Aitareya Brahmana i. 7, and the Taittirîya Sanhitâ vi. 1. 5. 1, that Aditi has been blessed with a boon that all sacrifices must commence and end with her. The story begins with the statement that the Sacrifice (the mysterial sacrificial personage) went away from the gods. The gods were then unable to perform any further ceremonies, and did not know where it (the sacrifice) had gone to; and it was Aditi that helped them, in this state, to find out the proper commencement of the sacrifice.* This clearly means, if it can mean anything, that before this time sacrifices were performed at random, but it was at this time resolved and fixed to commence them from Aditi. Aditi was thus the oldest and the first commencement of the sacrifice or the year. In the Vâjasaneyi Sanhitâ 4. 19 Aditi is said to be *ubhaya-taḥ śhīrshnī*, "double-headed," and the commentators

* Ait. Br. i. 7. A similar tradition about Orion is narrated in Greek mythology. It is stated that having lost his sight he followed a guide to the east in search of the sun and there, by exposing his face to the rising sun, his sight was restored.

interpret it to mean that the two termini of the sacrifices, which began and ended with Aditi, are the two heads here alluded to. These traditions are further corroborated by the sacrificial ceremonies. According to the sacrificial terminology the 4th day before Viṣhūvān or the central day of the yearly *satra* is called the Abhijit day. "In the sixth month," observes Dr. Haug,* "there are three Abhiplava, *śaḷahas* (six-days' periods) and one *Prishṭhya śaḷaha*." This makes up the first 24 days of the sixth month. The following days are thus enumerated: "the Abhijit day, the three *svarasāman* days and the Viṣhūvān, or the central day which stands quite apart." Thus if we exclude the Viṣhūvān day, as standing apart by itself, this gives us four days, and with the two days—*Atirātra* and *Chaturvinsha*—which are taken up by the initial ceremonies of the *satra*, we make up the *śaḷaha* wanted to complete the six months. The Abhijit day thus falls on the fourth day before the Viṣhūvān. Now if Abhijit day be supposed to be named after the Nakshatra of that name (*i. e.*, when the sun is in Abhijit) then the Viṣhūvān or the autumnal equinox must fall four days—or as the sun travels over about 1° of the ecliptic each day, 4°—after the asterism of Abhijit; and it can be shewn by astronomical calculation that, with Aditi or Punarvasū at the vernal equinox to commence the sacrifice, we get nearly the same result. In the *Sūrya Siddhanta* (viii. 3 table) the longitude of Punarvasū is said to be 93°, while that of Abhijit is 266° 40', that is, in other words, Abhijit would be about 6° behind the autumnal equinox or Viṣhūvān, if we suppose the vernal equinox to exactly coincide with Punarvasū. With the

* See Dr. Haug's translation of the *Aitareya Brāhmaṇa* iv. 12, p. 279, note.

vernal equinox in Punarvasû there is again no other Nakshatra nearer to or at the autumnal equinox to mark the Vishûvân day. We can, therefore, now understand why Abhijit, which is so far away from the ecliptic, should have been included in the old list of the Nakshatras. It marked the approach of the Vishûvân in the primitive sacrificial calendar, but when it ceased to be used for that purpose owing to the falling back of seasons, it was naturally dropped from the list of the Nakshatras, as it was far away from the Zodiac. If Bentley's suggestion about Mûla and Jyeshthâ be correct, this must have been done at the time when the vernal equinox was in Orion. But be that as it may, it will, I think, be clear from the above that the position of the Abhijit day in the sacrificial literature fully supports the tradition about Aditi, the presiding deity of Punarvasû, having discovered the commencement of the sacrifice. Aditi at this time must have also separated the Devayâna from the Pitriyâna and thus may have been appropriately called the mother of the Devas (Rig. x. 72. 5).^{*} It was from her that the Âdityas were born (Rig. x. 72. 8; Shat. Br. iii. 1. 3. 2), or the sun commenced his yearly course.

The only other tradition I could find in the Vedic literature about this position of Aditi is the story of the

^{*} Aditi is here said to be the daughter of Daksha, also cf. Rig. vii. 66. 2. In Purânîc traditions the 27 Nakshatras are said to be the daughters of Daksha who gave them to the moon. If we combine these two traditions Aditi would be at the head of all the Nakshatras, in the same way as Mîrgashiras or the Krittikas headed the list in later times. There are again many legends in the Purânas, stating that everything was born from Aditi. We can account for all these facts if we place Aditi at the vernal equinox, when the calendar was first fixed for the sacrificial purposes.

asterismal Prajāpati given in the Taittirīya Brāhmaṇa (i. 5. 2. 2).^{*} The asterism of Chitrā is here said to be the head of this Prajāpati, Svāti the heart, Hasta the hand, Vishākhā the thighs, and Anūrādhā the foot. Many conjectures are made about the meaning of this figure, but none of them satisfactorily explains why Prajāpati, who is said to be the god of time or the lustrum of years in the Vedāṅga Jyotisha, should have been represented in this way. I propose that we should interpret it after the manner of a similar representation of Brahman by Bādarāyana,† wherein the different signs of the Zodiac are said to be similarly related to the different parts of the body of Brahman or the Creator. Prof. Max Müller has thus translated the verse—"The ram is the head, the face of the Creator is the bull, the breast would be the man-pair, the heart the crab, the lion the stomach, the maid the hip, the balance-bearer the belly, the eighth (scorpion) the membrum, the archer his pair of thighs, the Makara his pair of knees, the pot his pair of legs, the fish his two feet."[‡] Thus if Mesha was Brahman's head when the *Rashis* were introduced, Chitrā could well be said to be the head of Prajāpati when the Chitrā full-moon commenced the year. But though we can thus satisfactorily account for the fact why Chitrā should have been called the head of Prajāpati, yet we can-

* यो वै नक्षत्रीयं प्रजापतिं वेद । उभयोरेनं लोकयोर्विदुः । हस्त एवास्य हस्तः । चित्रा शिरः । निष्ट्या हृदयं । ऊरू विशाखे । प्रतिष्ठानुराधाः । एष वै नक्षत्रीयः प्रजापतिः ।

† मेषः शिरोऽथ बदनं वृषभो विधातुः दक्षो भवेन्नुमिथुनं हृदयं कुलीरः । सिंहस्तथोदरमथो युवतिः कटिश्च बस्तिस्तुलाभृदथ मेहनमष्टमः स्यात् ॥
धन्वीचास्योरुयुगं मकरो जानुद्वयं भवति ।
जंघाद्वितयं कुंभः पादौ मत्स्यद्वयं चेति ॥

‡ *India ; what it can teach us ?* pp. 322, 323.

not give an equally satisfactory reason in the case of one of the Nakshatras in this representation, unless we place three intercalary months in five years. It is, however, very difficult to determine how the intercalary months were inserted, if at all, at this remote period, and the question must therefore, to a certain extent, remain unsolved for the present. The analogy of the pictorial representation of the twelve signs of the Zodiac in later days, is, however, a strong ground to hold that the asterismal Prajāpati may have been similarly conceived when the primitive year was first determined on the Nakshatra system. There is, so far as I know, no more evidence about this primitive calendar in the Vedic works, than what has been given above. But the traces of such period which we can discover in the sacrificial literature and especially the express mention in Taittiriya Saṁhitā that the Chitrā full-moon once commenced the year are, in my opinion, sufficient to prove the existence of such a calendar in the primitive days. We cannot otherwise account why the first and last offerings in every sacrifice should be made to Aditi and why Abhijit-day should precede the Viṣhūvān by four days. Compared to the evidences of the Orion period, these are slender materials for the construction of the primitive Vedic calendar, but they are decidedly superior to the materials on which Dr. Geiger has determined the primitive calendar of the Iranians.

It appears to me therefore that the oldest Vedic calendar like the oldest hymn, was sacrificial ; and that the sacrifice or the year commenced with Aditi at the vernal equinox in or near Punarvasū. The phases of the moon, the seasons and the *ayanas* further guided the ancient Aryas in measuring time for sacrificial purposes. The asterism of Abhijit marked the approach of Viṣhūvān or the central

day, while Punarvasu, which soon after came to be called Yamakau, perhaps Yama and Yamf, indicated the beginning of the year. Sometime after this and before the vernal equinox had receded to Orion, the lunar months and *tithis* or days appear to have come in use; and, in fact, the whole calendar seems to have been re-arranged, the year being made to commence from the winter solstice in the Chitra full-moon. But this did not alter the sacrificial system, which, so far as the procedure is concerned, still continues to be what it was in the oldest days. For all civil purposes the new calendar was, however, at once adopted and the two systems have continued to exist side by side up to the present day, though in a considerably modified form, as described before in the second Chapter.

The oldest period in the Aryan civilization may, therefore, be called the Aditi or the pre-Orion period, and we may roughly assign 6000-4000 B. C. as its limits. It was a period when the *finished* hymns do not seem to have been known and half-prose and half poetical Nivids or sacrificial formulæ "giving the principal names, epithets, and feats of the deity invoked" were probably in use. The Greeks and the Parsis have retained no traditions of this period, for the simple reason that they carried with them only the calendar which was in force when they left the common home, while the Indian Aryas have preserved all the traditions with a super-religious fidelity and scrupulousness. It is thus that I explain why the oldest Greek and Parsi traditions do not go beyond Orion.

We next come to the Orion period which, roughly speaking extended from 4000 B. C. to 2500 B.C., from the time when the vernal equinox was in the asterism of Ardra to the time when it receded to the asterism of the Kṛittikās.

This is the most important period in the history of the Aryan civilization. A good many *sāktas* in the Rigveda (e. g., that of Vṛṣhakapi, which contains a record of the beginning of the year where the legend was first conceived) were sung at this time, and several legends were either formed anew or developed from the older ones. The Greeks and the Parsis appear to have left the common home during the latter part of this period as they have retained most of these legends, and even the attributes of the constellation of Mrigashiras, otherwise called *Āgrayana*, Orion or the *Pauryaṇi*. We can now easily understand why no confirmatory evidence about the Kṛittikā-period is found either in the Rigveda or in the Greek and Parsi legends and traditions. This was pre-eminently the period of the hymns.

. The third or the Kṛittikā-period commences with the vernal equinox in the asterism of the Kṛittikās and extends up to the period recorded in the Vedāṅga Jyotiṣa, that is, from 2500 B. C. to 1400 B. C. It was the period of the Taittirīya Saṁhitā and several of the Brāhmaṇas. The hymns of the Rigveda had already become antique and unintelligible by this time and the Brahmvādins indulged in speculations, often too free, about the real meaning of these hymns and legends, attributing the use of the foamy weapon used by Indra to a compact between him and Namuchi. It was at this time that the Saṁhitās were probably compiled into systematic books and attempts made to ascertain the meanings of the oldest hymns and formulæ. It was also during this period that the Indians appear to have come in contact with the Chinese, and the latter borrowed the Hindu Nakṣatra system. I do not mean to say that Hindus might not have improved their system by the mutual interchange of ideas as they did

when they came to know of Greek astronomy. But the system was decidedly of Hindu origin and of purely Hindu origin being handed down from the remotest or the pre-Orion period in the Vedic literature. M. Biot was unable to assign any reason why the Chinese should have taken a leap from the shoulder to the belt of Orion to choose their fourth *sieu*. But with the older Hindu traditions the question admits of an easy explanation, as the belt was therein the real Mrigashiras or rather the top of Mriga's head.

The fourth and the last period of the old Sanskrit literature extends from 1400 B.C. to 500 B.C. or to the birth and rise of Buddhism. It was the period of the Sûtras and philosophical systems. It may be called the real pre-Buddhistic period. But as this has been sufficiently discussed by other writers I need not go into its further details.

I do not mean to lay down hard-and-fast limits of each of these periods of antiquity, nor do I intend to say anything about the period which must have elapsed before the Vedic Aryas were able to fix their primitive calendar in the Aditi period. The beginning of the Aryan civilization must undoubtedly be placed a long time before the people were able to conceive and determine the calendar. But I do not wish to enter here into these speculations. I take my stand only upon what we find recorded in the Vedic works, and hence all that I mean is that if the astronomical allusions, references, facts, and legends in the Vedic works can have any meaning, we cannot materially shorten the periods I have here indicated. We may not rely on vague traditional beliefs amongst one nation alone, but when we find that the traditions of India, Greece, and Iran, agree in their important features, and can be explained satisfactorily only by placing the vernal equinox in Orion, and when we have an express

authority for doing so in the Rigveda, I do not think that we can reasonably refuse to accept the conclusions deduced therefrom. It is true that we have determined the oldest Vedic periods from the traditions we find recorded in the Rigveda, and, strictly speaking, it is the period of the traditions and not of the hymns into which they have been incorporated. But this does not, in my opinion, materially affect the conclusions we have arrived at above regarding the ancient periods of the Vedic literature. I do not mean to deny that the hymns may not have been sung some time after these traditions and legends were originally conceived, or that after they were first sung the hymns might not have been somewhat modified *in form* in passing from mouth to mouth before they became settled in the form in which we now possess them. But though so much may be legitimately conceded, I think that it is impossible to hold that the hymns were composed thousands of years after the stories narrated in them, were first conceived. For, as a matter of fact, we find that the Rigveda hymns had already become antiquated and unintelligible in the days of the Taittirīya Sanhitā and the Brāhmaṇas. The Taittirīya Sanhitā places the vernal equinox in the Kṛittikās, and I have shown that we must fix its date at about 2500 B. C. If the hymns of the Rigveda Sanhitā were unintelligible at this time, they must have been sung several centuries before it. The comparison of the Taittirīya with the Rigveda Sanhitā further shows that while the first mentions three year-beginnings—one current and two old—the second only mentions one. Again, the Rigveda Sanhitā contains no reference to the Kṛittikās as the month of the Nakṣatras. I therefore conclude that the legends in question must have been incorporated into the hymns of the Rigveda, when

they were still intelligible, that is, in the Orion period. It is of course impossible to determine the dates of individual hymns. That all of them were not sung at one time, is quite evident from their style. Some of the hymns distinctly speak of older hymns or bards, while in Rig. x. 90·9 the hymns are said to proceed directly from the *purūṣha* or the sacrificial personage.* All that we can therefore legitimately say is that the hymns, which contain older traditions and legends, *e.g.*, of the Ribhus and Vṛishākapi, must have been composed in the Orion period. Some of the hymns may even be still older and some later, but generally speaking we may suppose that 4000 and 2500 B. C. are the *limits* of this period. This may require us to assume the existence of some Vedic verses at a time when the Hindus, the Greeks and the Parsis lived together. Some scholars may hesitate to accept such a conclusion. But so far as I know the conclusion is not inconsistent with the results of comparative Philology or Mythology. Prof. Max Müller in his *Biographies of Words* (pp. 188–198) gives a list of about sixty mythological names which may be shown to be common to Greek and Sanskrit.* If so many mythological names can be shewn to be phonetically identical, it is impossible to suppose that no songs, celebrating the deeds of these deities, existed in the Indo-Germanic period. Westphal has already proved the existence of poetry in the Indo-Germanic period, and Dr. Kuhn has endeavoured to trace whole formulæ back to the beginning of Indo-European

* For instance *Ribhu* is compared to Greek *Orpheus*, *Saramā* to Gk. *Elenes*, *Vṛitra* to Gk. *Orthros*, *Dāsahantar* to Gk. *Deophentes*. I have already referred to his suggestion regarding the comparison of *Vṛishākapi* with Gk. *Erikapæos*. If all these deities existed in the Indo-Germanic period, why not their hymns ?

poetry. Verbal coincidences such as, Sk. *pada*, Av. *padha*, Gk. *pous*, all meaning a metrical foot, again point to the same conclusion.* The results of comparative Philology, are, therefore, not only not inconsistent with, but, on the contrary, corroborate the conclusions we have independently deduced from the astronomical references and allusions recorded in the old Vedic literature. But I would not make my case rest on such grounds. It must be remembered that we have not been speculating in any way about the oldest Vedic periods. Our conclusions have been based on express statements and texts in the Vedic literature, and unless the texts themselves are questioned or other more reasonable interpretations suggested, we shall not be justified in disregarding these results, simply because they do not support certain literary hypotheses, guesses, or conjectures, as for instance, those that have been previously referred to in the first chapter. The results of the literary method may be moderate. But moderation is a virtue only when we have to make guesses about the periods of antiquity from uncertain data. Where however we have definite texts and traditions to rely upon, nothing but prejudice can deter us from drawing legitimate conclusions from them on the ground that they take us too far back. The astronomical method, I admit, is vague, in so far as it does not enable us to determine the exact date of *all* the Vedic hymns or works, but it is certainly superior to the linguistic method inasmuch as it supplies us with certain definite and undisputed facts, for instance, the position of the equinoxes which can safely be made the nuclei of the different

* See Dr. Schrader's Pre-historic Antiquities of Aryan Peoples, Part I., Chap. II., pp. 27, 28.

periods of antiquity. When the centres of each period are thus undisputably fixed and determined, we can then use the literary or the linguistic method to supplement these results by determining the duration of each period. There would then be no real opposition between the two methods. The one would determine the specific points of time, while the other would give us the range of the different periods. In other words, the first would supply the piers and the second the arches of the bridge, which we mean to construct across the period of antiquity, and which must therefore be completed with the assistance of both.

It may, however, be urged that if the beginning of the year was twice altered owing to the precession of the equinoxes, how is it that we do not find the traces of the intermediate stages or of the changes in the seasons in the old Vedic works? How, it may be further asked, did the Indian Aryas not discover the precession of the equinoxes in the early Vedic times? But it is not at all difficult to answer these questions. We might as well ask how no one before Bhāskarāchārya or Newton ever thought of the attraction of the earth, though since the very beginning of the human race every one observed heavy objects falling down to the surface of the earth. The reason is plain enough. Celestial and natural phenomena cannot be fathomed or understood without a steady and close observation for centuries, and, above all, until all the auxiliary, or rather the whole group of sciences are proportionally developed. If we bear this circumstance in mind, we can, I am sure, discover sufficient traces of the intermediate changes in the Vedic works. Thus we find that of all the ancient nations the Hindus alone had well nigh accurately determined the rate of the motion of the precession of the

equinoxes. Hipparchus considered it to be not less than 36'', while the actual motion at present is 50'. 25 per year. Ptolemy adopted, as observed by Prof. Whitney, the minimum of 36'' determined by Hipparchus; and it is evident that the Hindu astronomers who fixed the rate at 54'' per year could not have borrowed it from the Greeks. Prof. Whitney is at a loss to understand how the Hindus succeeded in arriving at a determination of the rate of motion, so much more accurate than was made by the great Greek astronomer, and he observes that it might be a "lucky hit on their part."* But why should they try to hit, even luckily, when they could have easily borrowed it from the Greeks? I am therefore disposed to think that it was independently, and almost correctly, discovered by the Hindus long before other nations could do so, though we cannot exactly fix the period when it was done; and that there were sufficient materials for the purpose in the old literature of India.

Let us next see what traditions about the intermediate stages have been preserved. First of all I refer to the tradition of Rudra killing Prajāpati, the god of time, for receding towards his daughter Rohiṇī. The Aitareya Brāhmaṇa (iii. 33) describes this conduct of Prajāpati as *akṛita* or unprecedented and such as deserved to be severely noticed by the gods. Can we not herein discover the fact that the sun was gradually receding towards Rohiṇī, by the precession of the equinoxes? The ancient priests, who observed the fact as they watched the Nakshatras at the commencement of the year, could not account for the change, and they rightly and honestly believed that it was a great calamity that the sun or Prajāpati

* See Whitney's notes to the Sūrya Siddhānta, iii. 13, p. 105.

should thus follow an unprecedented course. I have previously referred to a verse from Garga,* which says that if the Uttarâyana commenced otherwise than from the asterism of Dhanishṭhâ it foretold a great danger; and we may suppose that the Vedic Aryas similarly believed that if the sun ceased to commence the year from Orion, it was an unprecedented calamity. Parjâpati, however, was punished for his unusual conduct, and there the matter ended for the time being. I may also refer here to the ancient mode of deriving the word Rohiṇi. The Arabs called it Al-Dabaran or "the follower" evidently because it came next after the Krittikâs.† But the Hindus called it Rohiṇi, "the ascended," inasmuch as they noticed that the sun gradually ran towards it in oldest days. It has been suggested that we should explain the legend of Prajâpati by reference to the daily rising of Rohiṇi, Mṛigashiras, and Rudra in succession. But this explanation hardly accounts for the fact why Prajâpati was considered as literally after Rohiṇi in an *unprecedented* way. Surely we cannot suppose that the Vedic priests were ignorant of the fixed position of these constellations, and if so, we cannot account for the fact why they considered Prajâpati as running after and thinking of living together with Rohiṇi unless they had noticed the actual recession of the sun towards Rohiṇi owing to the precession of the equinoxes. The tradition of Prajâpati and Rudra is thus comparatively speaking a later tradition, though it seems to have been completely formed before the separation of the Greeks and the Parsis from the Indian Aryas.

* See *supra*, Chapter II, p. 19.

† See Whitney's notes to *Sūrya Sid.*, viii. 9., p. 185.

But the question which was dropped at this time after punishing Prajāpati, was again taken up when the equinox had receded to the Kṛittikās. The seasons had fallen back by one full month and the priests altered the year-beginning from the Phalgunī to the Maghā full-moon, while the list of the Nakshatras was made to commence from the Kṛittikās, instead of from Agraḥāyana. There is nothing surprising in the fact that the change should have been quietly introduced when we see that Varāhamihira did the same in the fifth century after Christ when the Ashvinī-system was introduced.* The calendar was mainly used for the sacrificial purposes, and when the priests actually observed that the sun was in the Kṛittikās, and not in Mṛga-shiras, when day and night were equal, they altered the commencement of the year to the Kṛittikās, especially as it was more convenient to do so at this time when the cycle of seasons had receded by one full month. The priests knew that the year commenced a month earlier in older days, but like Varāhamihira they must have appealed more to the actual facts, as they saw them, and introduced the change without attempting to discover its real cause.

The Vedāṅga Jyotiṣha introduces the third change, when the seasons had further fallen back, not by a month, but by a fortnight. It was probably during this interval that the beginning of the month was altered from the full-moon to the new-moon, and when this beginning of the month was so altered, advantage was taken of the receding of the seasons by a fortnight, to commence the year with the new-moon in Dhanishṭhā as the Vedāṅga Jyotiṣha has done.

* See *supra*, Chap. III., p. 36.

From this the next recorded step is to Ashvini. There is, however, an interesting story related in the Mahābhārata which evidently refers to an abortive attempt to reform the calendar when the seasons had again fallen back by a fortnight. In the 71st chapter of Âdiparva we are told that Vishvāmitra attempted to create a new world,* and make the Nakshatras commence with Shravana, instead of Dhanishṭha; and the same story is alluded to in the Ashva-medha Parva, chapter 44. The tradition can also be found in other Purāṇas where Visvāmitra is represented as endeavouring to create a new celestial sphere. It appears, however, that he did not succeed, and the Krittika-system, as modified by the Vedānga Jyotiṣha, continued to regulate the calendar until the list of the Nakshatras was quietly made to begin, as noticed in the third chapter, with Ashvini in later times.

We have thus an almost continuous record of the year-beginnings from the oldest time down to the present in the literature of India, and in the face of this evidence it is useless to indulge in uncertain speculations about the antiquity of the Vedas. I have already referred to the occurrence of the *pitri-paksha* in Bhādrapada as a relic of the time when the year commenced with the Phalgunī-full-moon. Our Shrāvaṇī ceremony appears to have been once performed in Bhādrapada (Manu iv. 95); and as it marked the beginning of the rains, when the herbs appear anew (Āshvalāyana

* Maha. Adi. 71, 34.

चकारान्यं च लोकं वै क्रुद्धो नक्षत्रसंपदा ।

प्रतिश्रवणपूर्वाणि नक्षत्राणि चकार सः ॥

and again in the Ashv. 44. 2.

अहः पूर्वं ततो रात्रिः मासाः शुक्लादयः स्युताः ।

श्रवणादीनि नक्षत्राणि ऋतवः शिशिरादयः ॥

Grihya Sūtra iii. 5. 2), we can here trace the recession of the rainy season from Bhādrapada to Shrāvaṇa, and from Shrāvaṇa to Āṣhāḍha (Sāṅkhyāyana Brāhmaṇa i. 3) and finally from Āṣhāḍha to Jyestha, as at present, thus fully corroborating the recession of the beginning of the year or the winter solstice from Chaitra to Phālguna, from Phālguna to Māgha, and from Māgha to Pausa. The evidence of the recession of the seasons is not, however, as complete as that of different year-beginnings, inasmuch as there are various local causes besides the precession of the equinoxes that affect the occurrence of the seasons. The seasons in the Central India and Central Asia cannot, for instance, be the same, and if the Aryas came into India from the North-West, the very change of locality must have caused a corresponding change in the seasons. The evidence of the change of seasons cannot therefore be supposed to be so reliable and conclusive as that of the successive changes in the beginning of the year above mentioned.

Lastly, there remains only one question to be considered. Is the Vedic period here determined consistent with the traditions and opinions entertained about it by the ancient and modern scholars? I think it is. I have already referred to the remarks of Prof. Weber who, though he regards the Kṛittikā evidence as vague and uncertain yet on geographical and historical grounds arrives at the conclusion that the beginnings of the Indian literature may be traced back to the time when the Indian and the Iranian Aryas lived together; and this opinion is confirmed by the fact that there are Yashts in the Zend Avesta which may be considered as "reproductions" of the Vedic hymns. Dr. Haug considers that this condition may be satisfied if we place the beginning of the Vedic literature in 2400

B. C.; * but he was not cognisant of the fact that the vernal equinox can be shown to have been in Mrigashiras at the time when the Parsis and the Indians lived together. In the light of this new evidence, there is therefore no reasonable objection for carrying the periods of the Vedic literature further back by over a thousand years or to about 4000 B. C. This period is further consistent with the fact that in 470 B. C. Xanthos of Lydia considered Zoroaster to have lived about 600 years before the Trojan War (about 1800 B. C.);† for according to our calculation the Parsis must have separated from the Indian Aryas in the latter part of the Orion period, that is to say, between 3000 to 2500 B. C.; while, if we suppose that the separation occurred at a considerably later date, a Greek writer in the fifth century before Christ would certainly have spoken of it as a recent event. Aristotle and Eudoxus have gone still further and placed the era of Zoroaster as much as 6000 to 5000 years before Plato. The number of years here given is evidently traditional, but we can at any rate infer from it this much that at the time of Aristotle (about 320 B. C.) Zoroaster was considered to have lived at a very remote period of antiquity; and if the era of Zoroaster is to be considered so old, *a fortiori*, the period of the Vedas must be older still. Then we have further to consider the fact that an epic poem was written in Greek in about 900 or 1000 B. C. The language of this epic is so unlike that of the Vedic hymns that we must suppose it to have been composed long time after the Greeks left their ancient home and travelled westward. It is not, therefore, at all improbable that they separated after the formation of the legends

* Dr. Haug's Intr. to Ait. Br., p. 48.

† See Dr. Haug's Essays on Parsis, p. 298.

of Orion and before the vernal equinox was in the Kṛittikās, that is, between 3500 to 3000 B. C. Finally, we can easily understand how the acutest and most learned of Indian theologians and scholars believed the Vedas to have come down to them from an unknown period of antiquity. A revelation need not necessarily be *anādi*, or without a beginning. The history of the Bible and the Koran shows us that a revelation can be conceived to be made at a particular period of time. If so, the mere fact that it is believed to be revealed does not account for the opinion entertained by the Hindu theological writers that the Veda has come down to them from times beyond the memory of man. Some of these writers lived several centuries before Christ, and it is quite natural to suppose that their opinions were formed from traditions current in their times. The periods of the Vedic antiquity we have determined render such an explanation highly probable. According to the Christian theology, the world was created only about 4000 years before Christ ; or, in other words, the notions of antiquity entertained by these Christian writers could not probably go beyond 4000 B. C. and not being able to say anything about the period preceding it, they placed the beginning of the world at about 4000 B. C. The Indian theologians may be supposed to have acted somewhat in the same manner. I have shewn that the most active of the Vedic period commenced at about 4000 B. C., and there are grounds for carrying it back still further. The *form* of the hymns might have been more or less modified in later times ; but the *matter* remained the same, and coming down from such a remote antiquity it could have been easily believed by Jaimini, Pānini, and the Brahnavadin of old to have been in existence almost from the beginning of the

world, or rather the beginning of all known things. We can thus satisfactorily account for all the opinions and traditions current about the age of the Vedas amongst ancient and modern scholars in India and in Europe, if we place the Vedic period at about 4000 B. C., in strict accordance with the astronomical references and facts recorded in the ancient literature of India. When everything can thus be consistently explained, I leave it to scholars to decide whether the above period should or should not be accepted as determining, as correctly as it is possible to do under the circumstances, the oldest period of Aryan civilization. It is the unerring clock of the heavens that has helped us in determining it, and it is, in my opinion, hardly probable to discover better means for the purposes. The evidence was in danger of being obliterated out of the surface of the heavens, when the Greeks borrowed their astronomical terminology from the Egyptians. But it has fortunately escaped and outlived, not only this, but also another threatened attack when it was proposed in England and Germany to name the constellation of Orion after Nelson or Napoleon as a mark of respect for these heroes. The bold and brilliant Orion, with his attendant Canis, preserves for us the memory of far more important and sacred times in the history of the Aryan race.

APPENDIX.

Âgrayana and Orion.

I have already stated in brief my reasons for provisionally identifying Sk. *Âgrayana* with Gk. *Orion*; and here I wish to examine the point more fully, not because my case rests upon it, but simply with a view to indicate the real nature of the objections that may be urged against the proposed identification. If philologists are still inclined to hold that the identification is not even probable, we shall have to look for some other Aryan derivation, as the similarity of the Eastern and Western traditions of Orion is, in my opinion, too strong to be accidental.

Âgrayana is evidently derived from *agra* and *ayana*. Of these *ayana*, which is derived from *i*, to go, may be represented by *ion* in Greek : cf. Sk. *âyus*, Gk. *aion* ; Sk. Comparative termination (nom. sin.) *îyân*, Gk. *ion* ; Sk. termination *âyana*, as in *Gargyâyana*, Gk. *ion*, as in *Kronion*, 'the descendant to Kronos'. The initial *a* in Sk. *Âgrayana* may also become *o* in Greek; as in Sk. *âshayana*, Gk. *okeanos* ; Sk. *âshu*, Gk. *okus*. Sanskrit *Âgrayana* may therefore be represented by *Ogrion* in Greek, and we have now to see if *g* may be dropped before *r* and *Ogrion* can be changed into *Orion*. It is a general phonetic rule in Teutonic languages that a guttural may disappear before a liquid, whether *initially* or *medially* ; cf. Ger. *nagel*, Eng. *nail* ; *hagel* and *hail* ; *regen* and *rain* ; Sk. *kravis*, O. H. G. *ro*. Prof. Max Müller has extended the application of this rule to Latin and Greek, and Latin and French in his *Lectures on the Science of Language*, Vol. II., p. 369. He compares Latin *paganus*

with French *paien*, Gk. *lâchnê* with Lat. *lâna*; and points out that on the same principle *lumen* stands for *lucmen*, *examen* for *exagmen*, *flamma* for *flagma*, K. Brugmann (Com. Gr. I., § 523) would derive O. Ir. *ār*, Cymr. *aer* from **agro* on the same principle. This shews that Sk. *agra* may be easily represented by *ār* in Teutonic languages. We may account for the change in two ways. We may either suppose that the final guttural of a root is sometimes dropped before terminations beginning with a liquid and thus put *luc-men*=*lu-men*, *fulg-men*=*ful-men*, *flag-men*=*fla-men*, *ag men*=*a-men*, *ag-ra*=*ā-ra* (with compensation vowel lengthening; Bopp derives Sk. *roman*, a hair from *ruh-man* growing, on the same principle); or we may suppose that the change is in accordance with the general phonetic rule which sanctions the omission of a guttural before a liquid in such cases. But whichever explanation we adopt, there is no question as to the change itself. It must not, however, be supposed that the rule is an uninflexible one and that a guttural *must* always be dropped before a liquid; for we find that a guttural in such cases is often either retained or labialised, cf. Sk. *grāvan*, O. Ir. *broo*, *bro*, (gen. *broon*), Cymr. *breuan*; Sk. *grināmi*, O. Ir. *gair*. The proper rule to deduce from these instances would therefore be, that *gr* in Sanskrit may be represented by *gr*, *br* or *r* in Teutonic languages, and that all the three changes are possible.

Can we not extend the rule to Greek and Sanskrit?—is the next question we have to consider. I do not mean to deny that there are phonetic rules which are not universally applicable to *all* languages. But the present rule can be easily shewn not to belong to this class. Prof. Max Müller has already extended it to Greek and Latin; and

Vararuchi, in his *Prākṛita Prakāśha* II. 2, lays down that *g* in *ga* may be *medially* dropped as between Sanskrit and Prakrit, e.g., Sk. *sāgara*, Pk. *sā-ara*; Sk. *nagara*, Pk. *na-ar*, eventually corrupted into *nara*, as in *Jun-nara* and other names of cities. This is in fact the same rule which, when applied to Teutonic languages accounts for the change of *segel* into *sail*, *nagel* into *nail* and so on. Comparison of Avestic *tigra* with Mod. Per. *tir* shews that a similar change may also take place between those languages. We may, therefore, fairly say that the rule about the omission of a guttural before a liquid obtains not only in Teutonic languages, but also between Greek and Latin, Latin and French, Sanskrit and Old Irish, Sanskrit and Prakrit, and Avestic and Modern Persian. In the face of these facts it would, I think, be unduly restricting the applicability of the phonetic rule if we refuse to apply it to Sanskrit and Greek. There is at any rate no *a priori* improbability in expecting that a similar change may take place as between Greek and Sanskrit. Let us now see if there are any instances as between Greek and Sanskrit to support such a conclusion.

Prof. Benfey compares Sk. *grāvan* with Gk. *laos* (Lat. *lapis*); and Sk. *ghrāna* with Gk. *ris*, *rin*os. If this comparison is correct, here at least we have two instances where a guttural before *r* in Sanskrit is lost in Greek. It is sometimes labialised, as in Sk. *krinami* Gk. *priami*; Sk. *guru*, Gk. *barus*; and sometimes retained as it is, as in Sk. *kratu*, Gk. *kratus*; Sk. *gras*, Gk. *grao*, to swallow. From these instances we may therefore infer that as between Greek and Sanskrit, the *initial* guttural in *kr* or *gr* in Sanskrit may be either retained as it is, or labialised or dropped in Greek,—the same rule which holds good, as shewn above, in Teutonic languages. It may be noticed here that while

grávan becomes *laos* in Greek, it is *broon* in Old Irish, that is, while the initial *g* of a Sanskrit word is labialised in Old Irish it is dropped in Greek. This shews that the initial *kr* or *gr* in Sanskrit may be differently represented in different languages. Sanskrit *krimis*, Lat. *vermis*, Gk. *elmis*; and Sk. *klipta*, Avestic *kerepta*, Gk. *raptos*, may, I think, also be regarded as further illustrations of the same rule. I know that the connection between the words last quoted is still considered doubtful, but that is because the rule about the omission of a guttural before a liquid, as between Greek and Sanskrit, is not yet recognised by scholars. If the examples I have given at the beginning of this paragraph are, however, sufficient to justify us in applying the rule to Greek and Sanskrit, the instances last cited may be taken as further supporting the same view.

With these instances before us, it would be unreasonable to deny that the three possible changes of *kr* and *gr*, which obtain in Teutonic languages, do not take place as between Greek and Sanskrit, at least *initially*; and if these changes take place initially, analogy at once suggests that they would also take place *medially*. At any rate there is no reason why they should not. It may be urged that a comparison of Sk. *chakra* with Gk. *kuklos* shews that a medial *kr* is retained as it is. But as pointed out above the argument is not conclusive. There may be cases where *kr* is retained as it is. But we have seen that by the side of such cases, instances can be quoted where it is changed to *pr* or *r* initially; and we may expect the same threefold possible change *medially*. It is admitted that labialisation takes place *medially*; and we have therefore to see if there are any instances where a guttural is dropped before a liquid in the body of a word. K. Brugmann tells us that

at one period *gn* and *gm* came to be represented by *n* and *m* in Greek ; cf. *gignomai* and *ginomai*, *stugnos* and *stunos*. Now this change in the body of a word is exactly similar to that of *agmen* into *amen*, and is evidently due to the same rule, which accounts for the latter change. Similarly Gk. *anoos* may be compared with Sk. *ajna*, and Gk. *arinos* to Sk. *aghrāna*. But I do not lay much stress on these inasmuch as these words may be supposed to have been derived by the addition of the prefix alpha to the already existing Greek forms, and not directly obtained from Sanskrit *ajna* and *aghrāna*. The change of *gignomai* into *ginomai*, or of *ignosko* into *ginosko* cannot, however, be so accounted for, and if *g* before *n* is dropped in the body of a word, there is no reason why it should not be dropped before *r*, on the analogy of the phonetic rule given above. Works on philology do not give any more instances of such changes, but as observed above, the attention of scholars does not appear to have been directed to this point. Otherwise I do not think it was difficult to discover the similarity between Gk. *tuos* and Sk. *takra*. *Takra* is derived from *tanch* (**teng*) to contract, to coagulate or curdle, and according to Fick the root is Indo-Germanic. It is an old Vedic root, and we have such expressions as *dadhnā ātanakti* 'coagulates (milk) with curds' in the Taittiriya Sanhitā II. 5. 3. 5. *Takra* therefore literally means 'curdled milk' and not 'curds mixed with water' as this word is understood in modern Sanskrit. Now, if we suppose that the rule, which sanctions the omission of *g* or *k* before *r* or *m* in other languages, also holds good as between Greek and Sanskrit, not only initially (as in *grāvan* and *laos*) but also medially, as in *gignomai* and *ginomai*, Sk. *takra* may be easily identified with Gk. *tuos* meaning 'cheese.' *Takra* may thus be said to

have retained its root meaning in Greek. *Turos* is an old Greek word used in the *Odyssey*, and it has not yet been explained by anything in Indo-Germanic. Dr. Schrader therefore records a suggestion that it should be derived from Turko Tartaric *turak*. But if Sanskrit *sāra* and *sārpis* are found in Greek *oros* (whey) and *elphos* (butter,) it is not reasonable to suppose that *turos* alone was borrowed from a non-Aryan source. *Takra* in modern Sanskrit means 'curds mixed with water and churned' and perhaps it may be contended that we cannot identify it with *turos*, which means 'chees.' I have, however, shewn that *takra* etymologically means 'curdled milk' and not 'curds dissolved in water' which is evidently its secondary meaning. Besides when we see that *sāra* which in Sanskrit denotes 'curdled milk,' has become *oros* = whey in Greek, and *serum* in Latin, there is nothing unusual if we find *takra* and *turos* used in slightly different senses in the two languages. I have already suggested in the body of the essay that we may identify Sk. *Shukra* with Gk. *Kupris*. *Chakra* = *kuklos*, *Shukra* = *Kupris*, and *takra* = *turos*, may thus be taken to illustrate the application of the rule above discussed, regarding the three-fold change of *kr* or *gr*, to Greek and Sanskrit *medially*; and instances have been already quoted to show that the rule holds good *initially* as between Greek and Sanskrit. We may therefore conclude that the change of *gignomai* into *ginomai* is not a solitary instance, and that as a general rule *g* may be dropped, labialised or retained before a liquid as between Greek and Sanskrit whether at the beginning or in the body of a word. We might even discover further instances of the applicability of this rule; for, if *takra* is thus correctly identified with *turos*, we may, on the same principle identify Sk. *agra* with Gk. *oros*, meaning top, summit. It was impossible to represent

Sanskrit *agra* by a separate Greek word otherwise. It could not be represented by *agros* in Greek as the latter word corresponded to Sk. *ajra*, a field; nor can *agra* be changed to *akris* which represented Sk. *ashri*. Sanskrit *agra*, therefore, naturally came to be represented by *oros*. *Oros*, meaning top or summit, has not yet been satisfactorily derived in any other way.

It will be seen from the above that we have sufficient grounds to hold that the rule about the omission of a guttural before a liquid, whether *initially* or *medially*, applies to Greek and Sanskrit in the same way as it does to other languages; and if so, Sk. *Agrayana* can be represented by *Orion* in Greek.

I have already quoted Brugmann to show that **agra* becomes *ār* or *aer* in Teutonic languages. Now further comparing Lat. *integrū*, *integer* with Fr. *entier*; Gk. *dakru* Goth. *tagr* with Eng. *tear*; *pagan* with *païen* and *regen* with *rain*, we are led to infer that where *h* or *g* is dropped before *r* or a liquid we may expect *two* contiguous vowels, probably because this *gr* is at first optionally altered into *ger* or *gar*. We can now understand why *Orion* was sometimes spelt as *Oarion*; and the existence of this double form confirms, in my opinion, the derivation above suggested. As for *Orion* alone we might derive it from *oros*, limit, or *ōra*, spring, and *ion*, going, thus giving the same meaning, *viz.*, the limit or the beginning of the year or spring, as *Āgrayana* in Sanskrit. But this does not account for the double form—*Orion* and *Oarion*—unless the latter be taken for a poetic or a dialectic variation of *Orion*. I therefore prefer to derive the word from Sanskrit *Āgrayana*.

